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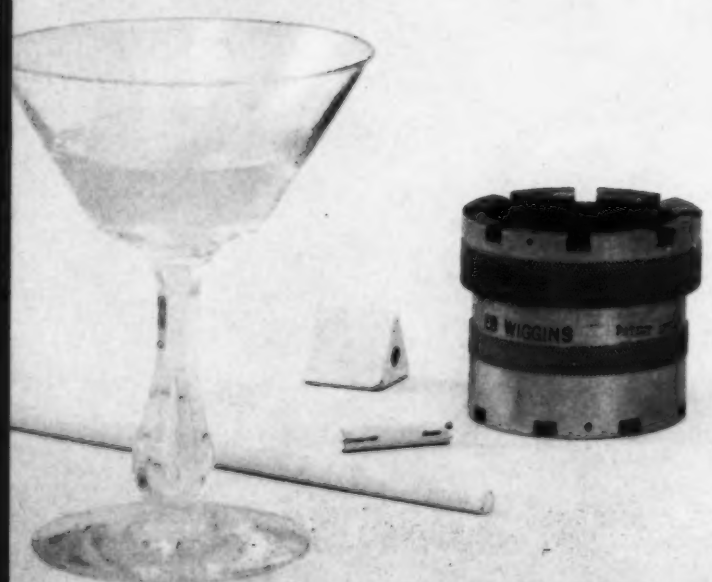

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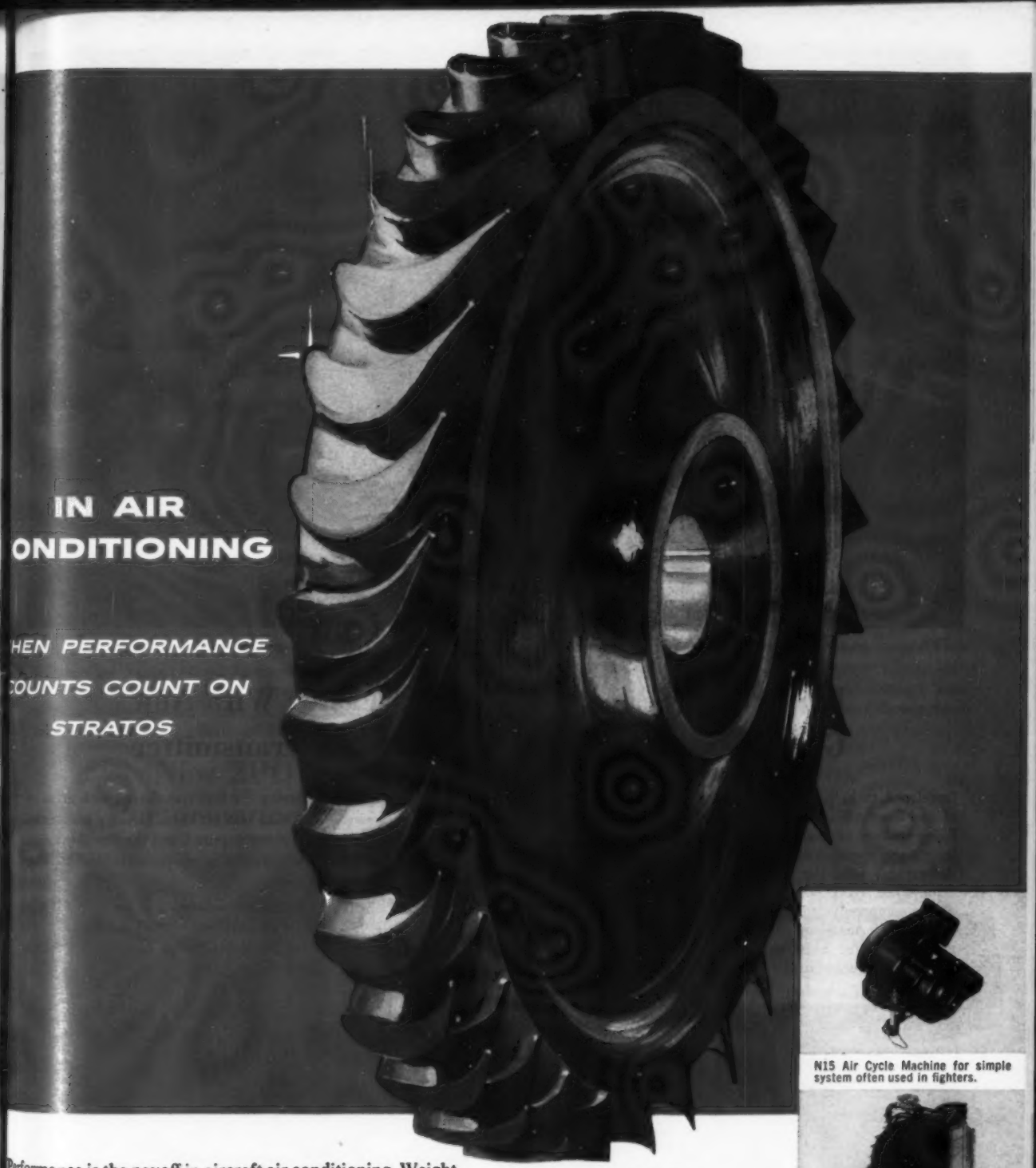

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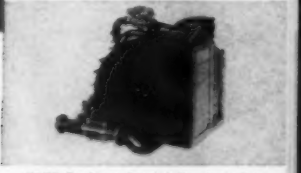

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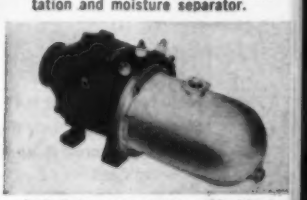

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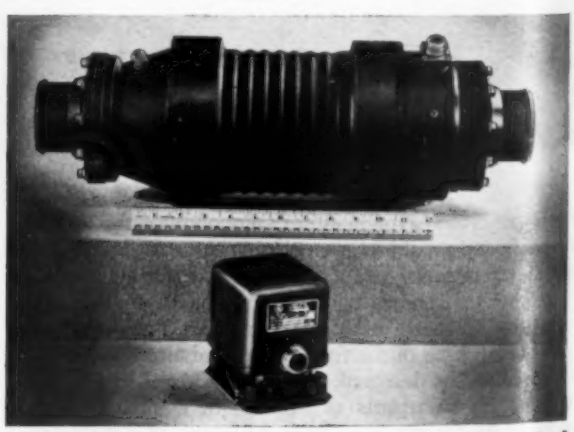
KB-50 carries out simultaneous refueling of three North American Super Sabres.

Fuel Flow Measured 50 Times Faster With New General Electric In-Flight Refueling Transmitter

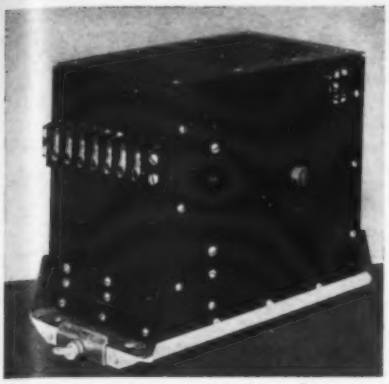
Developed to help speed in-flight transfer of fuel from Air Force KB-50 and KC-135 flying tankers to bombers and fighters on long-range operations, the G-E In-Flight Refueling Transmitter is capable of measuring up to 10,000 pounds of fuel per minute as compared with the 200 pounds per minute performance of earlier models. The new transmitter unit, weighing only 17 pounds, is mounted in the fuel line leading to the line or boom which extends from the tanker plane during refueling. The transmitter complements its light weight with rugged construction to withstand the shock of peak flow surges including reverse flow—the sucking back of fuel when the refueling line or boom is retracted into the tanker. The flowmeter transmitter can operate at pressures up to 480 pounds per square inch, metering the fuel transferred with error of less than one per cent. Density compensation is not required, and the new flowmeter is insensitive to temperature and altitude changes.

For more information on this or any other aircraft fuel control instruments call your nearest General Electric Apparatus Sales Office.

Mounted in each of the three refueling lines on the tanker, the General Electric in-flight refueling transmitter meters fuel to the receiving aircraft at pressures up to 480 pounds per square inch.



This lightweight G-E transmitter can measure up to 10,000 pounds of fuel per minute. One power supply provides a constant-frequency source from which all three transmitters are operated.



10 pound transformer-rectifier has expected life of 3500 hours at temperatures to 71 C.

General Electric, unregulated transformer-rectifier will give the Douglas DC-8 28-volt d-c power. Voltage fluctuation is limited to ±7.3 percent without additional regulation.

Lightweight, Unregulated Transformer-Rectifier for Douglas DC-8 Features Narrow Voltage Fluctuation

Four General Electric unregulated, airborne transformer-rectifiers, rated 35 amperes, 28 volts at full load, will furnish direct-current power for the new Douglas commercial jet airliners. The significant feature of the unregulated units is the minimum voltage fluctuation and one volt maximum peak ripple attained without reactors or other bulky regulation components. Within a load range of 0 to 25 amperes and 400-cycle input changes ranging from 195 to 202 volts line to line, the output voltage will remain within the limits of 25 to 29 volts. Maximum performance within these limits can be expected through 3500 hours of operation and at temperatures up to 71 C.

By using a transformer-rectifier, the new jet transport will have a reliable source of "on-the-spot" d-c power without the weight penalty of additional generating equipment and long bus runs. The G-E unregulated transformer-rectifier weighs less than ten pounds and contains no moving parts. The unit consists of a three-phase transformer and Vac-u-Sel* high temperature, selenium rectifier cells and contains a shunt for measuring output current. Each is convection cooled and has an expected life of 3500 hours when operated at 35-ampere loads; within the limits of 25 to 29 volts over any input or load condition up to 25 amperes the same life is expected.

For further information on General Electric airborne, transformer-rectifiers, both regulated and unregulated, contact your nearest G-E Apparatus Sales Office or check "A" on coupon below.

New 2PDT Subminiature Relay Gives Reliable Performance at 30 G Shock, Temperatures to 125 C

Latest addition to General Electric's line of hermetically sealed relays qualifies for severe-condition applications.

Built to give increased reliability to electronic equipment subjected to severe environmental conditions, the new General Electric 2PDT Subminiature relay withstands 30 G's shock with no contact opening in either energized or de-energized positions. The relay, rated 2 amps, is suitable for continuous operation in 125 C ambient temperature and is unaffected by vibrations of 10 to 55 cps at .12 inches total excursion or 55 to 500 cps at 15 G's acceleration. The operating advantages of this relay are further complemented by small size, .651 inches in diameter by 1.83 inches in length for the standard unit. The relay weighs approximately one ounce and is available in a wide variety of coil ratings.

Fatigue resistance is increased by heat treating the beryllium copper contact springs. The relay magnet is the conventional plunger type with provision made for adjusting the open gap position of the plunger after the relay is assembled in the can. Operating time with nominal voltage applied to the coil is approximately 10 milliseconds; drop-out time approximately 5 milliseconds.

*Trade-mark of the General Electric Co.

For more information on the 2PDT relay and other types of General Electric hermetically sealed relays, contact your nearest G-E Apparatus Sales Office. Check block "B" below for your free copy of the new 2PDT subminiature relay brochure.

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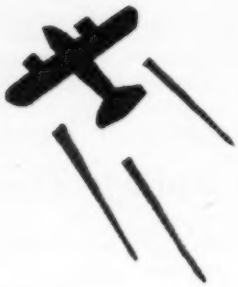

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PUBLISHING INFORMATION

Published: Every other Monday by American Aviation Publications Inc., Washington, D. C. Printed at The Telegraph Press, Harrisburg, Pa. Entered as Second Class Matter in Washington and Harrisburg.
Subscription Rates: For U.S. and Canada—$5.00 for 1 year; $8.00 for 2 years. Other countries—$7.00 for 1 year; $12.00 for 2 years. Subscription limited to aviation industry personnel.
Incorporates: Airports and Air Carriers; Aviation Equipment, The American Pilot; Aviation Sales & Service; U.S. Aviation; and American Airports.

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Change of Address: Send old address (exactly as it appears on mailing label on your copy of magazine) and new address, including zone number if any, to American Aviation, 1001 Vermont Avenue, N.W., Washington 5, D. C. Allow two weeks for changeover.

PUBLISHING CORPORATION

American Aviation Publications Inc.: Principal offices at 1001 Vermont Ave., N.W., Washington 5, D. C. Wayne W. Parrish, president; Leonard Eiserer, executive vice president and general manager; William H. Pearson, vice president and director of advertising; Albert H. Stackpole and Eric Bramley, vice presidents; E. J. Stackpole, Jr., Secretary.

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Missiles and Rockets: Magazine of World Astronautics. For those in missiles and rocket industry and satellite science. $8.00 for 1 year; $12.00 for 2 years (U.S.A. and Canada); Overseas—$9.00 for 1 year; $14.00 for 2 years.
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VOL. 20 NO. 18

51,100 copies of this issue printed

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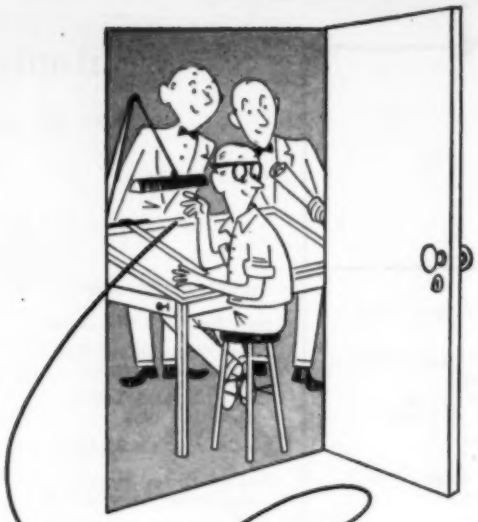

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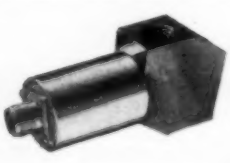

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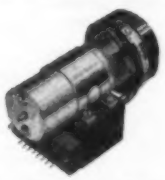

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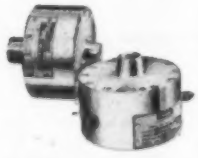

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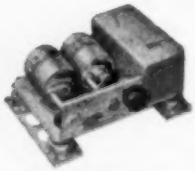

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Personal View

By WAYNE W. PARRISH

How Adequate is the USAF Budget?

WHAT ABOUT the new Air Force budget? Is it a fraud, is it bare minimum, or is it adequate?

A well-considered opinion is that it is not a fraud. The area of disagreement comes within the range of minimum to adequate. It is impossible to assign a single word or phrase. It is strong in some respects, weak in others.

It is bound to stir up enormous controversy. As of this writing no one except Senator Stuart Symington knows what the former Secretary of the Air Force will bring out in his long-awaited report now due the week of January 28. But it is expected that the Missouri Senator will blast the Administration budget as quite inadequate.

All too much attention, we fear, will be focused on the reduction in the number of USAF wings. A decrease of nine wings sounds ominous. Yet we feel that this is not the real area for limelight. As we said recently on this page a "numbers game" controversy can be most unfortunate.

The real target for attention should be the degree of support provided for USAF research and development. The new budget provides all-out support for development of intercontinental ballistic missiles, but it falls short of taking care of other important projects which lack the dramatic appeal of the ICBMs.

Cancellation of the Martin TBX advanced tactical bomber project, for example, leaves the Tactical Air Command with no "next generation" aircraft in its development pipeline beyond the Republic F-105 now undergoing flight tests. Furthermore, there are indications that the North American Navaho may have to be curtailed substantially because of the fund shortage. The Navaho, it should be said, may not have the startling quality of the ICBM, but it is a fine weapon in its own right in addition to being a hedge against unexpected obstacles in the ICBM program.

Another area for inquiry is procurement. The budget does provide for equipping the last of SAC's eleven heavy bomb wings with B-52s, and it also provides for purchase of B-58s as well as some of the later Century series of fighters. Nevertheless, the number of aircraft in the program—little more than 1,500—seems precious few in relation to the size of USAF's active inventory of more than 24,000.

In short, the budget covers essentials. It is minimum. But it isn't much on futures. And here is where Congress should focus its attention.

The Remedy Is So Simple

THE airlines are still working on a formula for self-regulation to eliminate unrealistic scheduling but the whole problem could be cleared up quite easily if certain managements would take some simple action to correct the relatively few abuses.

For example, we were on an interchange flight recently. It's never on time. To put it conservatively, this flight has been underscheduled by 45 minutes. Only an unusually good tailwind could ever get the slow equipment to its destination at the advertised time. The result is that day after day and month after month there has been a sorry trail of missed connections, waiting friends, irritations and frustrated pilots who get pretty tired of having to get on the intercom every trip to advise passengers apologetically they'll be late.

Odd part of it is that the flight is not competitive in any real sense. Not a passenger would be lost by advertising a realistic schedule. This is the sort of scheduling abuse for which there can be no justification. All it takes is a management decision to correct it.

Mr. Burgess Accepts

Considering the whims and vagaries of owner Howard Hughes, the presidency of TWA hasn't exactly been the most sought-after job in the country. But TWA attorney George Spater had a thoroughly potent idea when he tossed the name of Carter Burgess into the hopper as a worthy prospect. The TWA directors bought it; so did Howard Hughes. And so did Mr. Burgess, a man once with the company who has built up quite a solid reputation in Washington in the past few years. Mr. Burgess may well turn out to be what the doctor ordered. He recognizes all the problems and that's half the battle right there. Looks like a good break for TWA and that means a good break for the industry. Welcome to the challenge, Mr. Burgess. A lot of folks want you to succeed.

Looks Good

The White House selection of Louis J. Hector of Miami to fill the Democratic vacancy on the Civil Aeronautics Board has all the earmarks of a good choice. He would succeed Joseph P. Adams. Mr. Hector enjoys an excellent reputation as a lawyer, he has had a fine background and education, and he doesn't need the job. While geographical considerations are of quite secondary importance to the caliber of man needed for CAB, we feel that representation from the southeast has been neglected. From where we sit it looks like a happy deal all the way around.

Must Reading

Harold Mansfield has made a permanent contribution to aviation with his book "Vision" published recently by Duell, Sloan & Pearce. It's the story of the 40 years of the Boeing Airplane Company but it's much more than that—it is a fascinating panorama of aviation history. Names and incidents flow through the book in engaging manner.

Not only do we recommend the book as "must" reading on many counts, but we will guarantee that if anyone in the aviation business reads three pages he'll finish the entire book. Four stars to Mansfield and a greenhouse of orchids to all of the men who made history while building a great company.

Letters

No Pity for Pilots

To the Editor:

Have just read "What Pilots Want When Jet Age Comes," by Charles Schaeffer, and if they give it to them we shall have the biggest bunch of neurotic pilots on our hands since the round wheel. Just what does a pilot think he is?

Recently I had to be ferried from Baltimore airport to Washington via the airport bus due to a flight cancellation and the poor bus driver worked harder on that 40-minute drive, risked his neck more times and got 'way less pay than the two pampered fancy pants, masquerading as pilots, did on the ensuing four-hour flight I caught.

It took one of them five minutes to start, run up and take off, and another five minutes to land. In the ensuing time they did the following: spent one-third of the time passing time with one or the other of the stewardesses; one read soft-backed paper magazines at all times; ate the full meal served passengers, plus numerous cups of coffee to tide them over the "rough" grind and checked the passengers at each new stop by strolling up and down the aisle after being airborne, presumably for any good-looking prospects to make out with.

With this huge work load to cope with, I was amazed that we didn't have a flight engineer.

Now that we are entering into a new era of advancement with technological improvements that make flying twice as simple, these pilots want more people to help them do nothing and less time to do it in.

In case this sounds like sour grapes, I have held a commercial pilot's license since 1946, and have been flying since 1942.

NAME WITHHELD BY REQUEST.
Indianapolis, Ind.

Bouquet

To the Editor:

A note to tell you that you are to be congratulated on getting Sam Saint. He is one of the best men you could add to your already fine staff.

CHARLES F. WILLIS, JR.
7 Hanover Square
New York, N.Y.

Books

Supersonic Inlet Diffusers & Introduction to Internal Aerodynamics. *By Dr. Rudolf Hermann, published by Aeronautical Div., Minneapolis-Honeywell Regulator Co., Minneapolis 13, Minn., 378 pp. Illustrated. Price $16.00.*

An extensive treatment of the design of supersonic inlet diffusers intended for engineers engaged in turbojet inlet and control work, based on author's 25 years of experience in experimentation on supersonic aerodynamics. Dr. Hermann, a consultant to Minneapolis-Honeywell and professor of aero engineering at Univ. of Minnesota, has directed at least four Army or Air Force research contracts in inlet diffusers for aircraft or missile application.

LOST? It can happen to the best of PA's and other seat-buying airline execs! Seats, like other custom-built products, could easily get a guy "lost in the woods" over involved specs, costs, weights, production schedules, design evaluations and other details not usually a problem in buying routine replacement items.

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When & Where

JANUARY

Plant Maintenance Show, eighth annual, Public Auditorium, Cleveland, Jan. 28-31.

Institute of the Aeronautical Sciences, 25th annual meeting, Sheraton-Astor Hotel, New York City, Jan. 28-Feb. 1.

Convertible Aircraft Pioneers annual meeting, Engineers Club, New York City, Jan. 30.

Aircraft Digital Computing conference sponsored by New York U. and IBM, NYU, Bronx, N. Y., Jan. 31-Feb. 1.

Agricultural Aircraft Assn., annual convention, Hotel Californian, Fresno, Calif., Jan. 31-Feb. 2.

FEBRUARY

Society of the Plastics Industry annual exhibit and conference of reinforced plastics div., Edgewater Beach Hotel, Chicago, Feb. 5-7.

Instrument Society of America, Aeronautical Div. of New York Section annual mid-winter conference, Garden City Hotel, Garden City, L. I., Feb. 7.

Annual Jet Age Conference, sponsored by Air Force Assn., Sheraton-Park Hotel, Washington, D.C., Feb. 14-15.

Western Joint Computer Conference, sponsored by IRE, AIEE and ACM, Hotel Statler, Los Angeles, Feb. 26-28.

Management Research Symposium on Transportation, Purdue University, Lafayette, Ind., Feb. 27-28.

MARCH

Annual Air Safety Forum of Air Line Pilots Assn., Hotel Shoreland, Chicago, Mar. 5-7.

National Conference on Aviation Education, sponsored by National Aviation Education Council, Mayflower Hotel, Washington, D.C., March 7-8.

Nuclear Congress & International Atomic Exposition, Convention Hall, Philadelphia, Mar. 11-15.

IAS Flight Propulsion Meeting (classified), Hotel Carter, Cleveland, Mar. 14-15.

Gas Turbine Power Conference, sponsored by ASME, Sheraton-Cadillac Hotel, Detroit, Mar. 18-21.

American Society of Tool Engineers, Silver Anniversary meeting, Shamrock-Hilton Hotel, Houston, Tex., Mar. 25-27.

Western Metal Exposition and Congress, sponsored by American Society for Metals and other technical groups, Pan-Pacific Auditorium and Ambassador Hotel, Los Angeles, Mar. 25-29.

APRIL

SAE Aeronautic Meeting and Production Forum, Hotel Commodore, New York City, Apr. 2-5.

IRE Professional Group on Telemetry and Remote Control, national symposium, Philadelphia, Apr. 15-17.

Arnold Air Society annual conclave honoring 50 years of military air power, Hotel New Yorker, New York City, April 17-20.

Airport Operators Council, Conrad Hilton Hotel, Chicago, Apr. 28-May 2.

MAY

American Assn. of Airport Executives annual convention, Shamrock-Hilton Hotel, Houston, Tex., May 5-8.

Washington Report

Ike's Views on AF Wing Cuts

Presumably anticipating that the proposed reduction in Air Force wing strength (from 137 to 128) and other force level changes would cause howls in the House and Senate, the budget message to Congress uses all the prestige inherent in a President who formerly was a five-star general.

Says Mr. Eisenhower in his transmittal:

"The introduction of new equipment and weapons with vastly greater combat capability is also having a powerful impact on concepts of military strategy, tactics and organization. The combat power of our divisions, wings and warships has increased to such an extent that it is no longer valid to measure military power in terms of the number of such units.

"I have given careful consideration to the many complex factors which enter into the development of a well-balanced military structure. I am convinced that the defense programs and funds for their support as recommended in this budget provide a wise and reasonable degree of protection for the nation."

USAF Chief of Staff Gen. Nathan F. Twining said the Air Force is getting less than it wants.

He pointed out however, that no military service ever gets all it feels it requires, but added: "With the resources we are given we will shape the best Air Force we can." He indicated the more than $17 billion in new money will enable AF to get through the next fiscal year "without undue risk."

Neither statement is expected to appease congressional airpower protagonists, who will make political hay, as they did last year, over "weakening the nation's defenses."

Budget Hits AF Training Program

Air Force hopes for fiscal '58 funds for procurement of jet combat-readiness trainers have been dashed. Limited budget request allows just a token amount of funds for new trainer procurement, if any at all.

Only top priority procurement has been allowed. End result will be shelving the off-the-shelf competition for a twin-jet and four-jet CRT and utility aircraft.

Under its restricted budget, USAF does not feel it can justify the procurement. But it certainly has not given up its desire to find a way to keep "desk bound" command pilots proficient in jet equipment.

Shortage of Lockheed T-33s was cited as justification for procurement of new-type jets. Two possibilities are apparent for solution of the jet readiness problem:

1. Divert T-33s for such use as they are phased out in favor of Northrop T-38 supersonic trainer, scheduled to become operational in calendar 1959.

2. Find wider uses for off-the-shelf aircraft to justify more fully procurement of one or both configurations. If a choice is left open, the four-engine type might find wider use—not only for CRT, but for navigation and electronics training to replace B-25s.

Loran to be Expanded

Despite long drawn-out debate over which long-range navaid is best for international airline use—Loran, Consol or Navarho—prospects are that government-endorsed Loran will continue to prevail.

Defense Dept. has authorized up to $5.5 million of fiscal 1957 appropriation for more Loran stations and says authorization for additional stations is expected in 1958.

The military has switched sides many times during past years, but Coast Guard proponents of Loran keep winning with new station installations, which reportedly are based on Navy and Air Force needs.

Loran is used by both ships and military aircraft—and a few airlines—primarily in North Atlantic navigation.

State Post for R. E. Smith?

Eisenhower Administration has its eye on a young Costa Rican airline executive, Robert E. Smith, for the post of Assistant Secretary of State for Latin American affairs.

Smith, 35, is general manager of LACSA, has the backing of several key Administration advisers familiar with the Latin American picture.

He has some tough competition, however: Vance Brand, vp Export-Import Bank; Cong. Clarence Brown (R-Ohio); former U.S. ambassador to Venezuela Walter Donnely. Job currently is held by interim appointee Richard Roy Rubottom, a career diplomat.

Curtis Looks Far Ahead

White House special aide, Edward P. Curtis, in the last stretch of his aviation facilities planning assignment, now has a good look into the future magnitude of U.S. air transportation. Rough-cut statistics supplied by his requirements group predict for the next two decades:

1. By 1961, 68% of the airlines' fleet will carry 40 to 90 or more passengers, with the trunkline fleet 75% turbine-powered. By 1957, 90% will be turbine-powered, with about 40% large jet transports carrying 90 or more passengers. (In 1956, 57% of the fleet carried 40 or fewer passengers, 43% over 40).

2. General aviation will see a much greater increase in numbers of aircraft and movements, "perhaps in the neighborhood of four times the 1956 figures by 1975."

3. There will be gradual decrease in numbers of military planes over the years as missiles are developed and made operational.

Jet Briefing for NBAA

Air Force is taking steps to improve relations between the military and general aviation. A casual mention of a jet age briefing for business pilots made before the National Business Aircraft Assn. (AMERICAN AVIATION, Nov. 5, p. 10) has materialized into a formal invitation from Lt. Gen. Thomas Power, commander of Air Research and Development Command.

NBAA members have been invited to attend a special jet know-how symposium to be conducted by ARDC specifically for NBAA members at Wright-Patterson AFB Feb. 7-8.

Symposium will be similar to Air Force briefings for airlines, will deal with all aspects of jet operations. More than 200 NBAA members and guests are expected to attend.

This will mark the first major military effort to brief a general aviation group directly.

Industry News Digest

Airlines Fail to Agree on System For Penalizing 'No-Show' Passengers

The domestic airlines have failed to agree on a system for penalizing passengers who cancel reservations less than six hours before flight or who "no-show."

The Air Traffic Conference decided in Washington Jan. 17 to postpone action on a penalty plan until its April meeting. In the meantime, a special committee headed by National Airlines vice president Walter Sternberg will try to draft an acceptable plan.

Although no formal vote was taken at the Jan. 17 meeting on the penalty system submitted by an ATC working group, it was evident from views expressed that any such vote would have fallen far short of the three-quarters majority required for adoption. Some airlines felt the plan was so complicated that it would be unworkable. Others still oppose any kind of a penalty.

The Minimum Time Limit (MTL) plan for ticket pickup—Phase I of the program to overcome the late cancelation and no-show problem—remains in effect. Phase II—the penalty plan—remains "on the books" but is not in effect, pending outcome of the April meeting.

• **An informal poll** was taken at the ATC session to see how many lines would agree to retain MTL and to reinstate the old rule, dropped in 1955, requiring passengers to reconfirm their intention to use reserved space. Four airlines—American, Braniff, Western and Mohawk—would not accept. A few abstained from voting.

Sternberg's group will consider at least three proposals: (1) National Airlines' "reservations charge" plan, (2) a Delta penalty plan, (3) a combination of MTL and reconfirmation.

• **NAL's plan** provides that a passenger could reserve a seat more than three hours before departure by buying (1) a "basic" transportation ticket, and (2) a "reservations charge" ticket—either a percentage or a flat fee. Within three hours of departure, a passenger would buy only the basic ticket. Space would be confirmed, if available, or the passenger registered as a standby.

The basic ticket would always be refundable; the reservations ticket would either be non-refundable or refundable at a predetermined time before departure, less an amount to cover cost of making the original reservation.

Delta proposes penalties for late cancelations and no-shows. A passenger canceling or changing space by phone in time to avoid penalties would be given a code number to write on his ticket.

When the ticket is presented for refund, the agent would check the code to ascertain if the passenger is entitled to full refund.

Three B-52s Fly Around World in 45 hrs. 20 min.

Three B-52 jet bombers of USAF's Strategic Air Command landed in California Jan. 18, culminating the first nonstop jet flight around the world.

The 24,325-mile eastbound trip was completed in 45 hrs. 20 mins., cutting by one-half the record of 94 hrs. set eight years ago by Lucky Lady II, a piston-engine B-50. The B-52s averaged 525 mph, aided by prevailing winds.

KC-97 aerial tankers refueled the jet bombers several times. Five of the aircraft started the trip from Castle AFB, Calif., on Jan. 16; one diverted to England, and another washed out because of mechanical trouble.

A simulated bombing mission was carried out past the Malayan Peninsula, half-way point of the trip.

Maj. Gen. Archie Old Jr., commander of the 15th Air Force at March AFB, where the three planes landed, was flight commander. Gen. Curtis E. LeMay, SAC commander, said the flight was a "demonstration of the SAC global capabilities to strike any target on the face of the earth."

Electronics Procurement For '56: $2.73 Billion

Procurement of electronics equipment by the Defense Department in fiscal 1956 totaled $2,733,000,000, with aircraft and guided missiles getting more than half of the money, according to the Radio-Electronics-Television Manufacturers Association.

Of the total, aircraft received $925,000,000 of the electronics money, while $630,000,000 went to missiles. In other categories, "research and development" received $265 million and "electronics and communications" $770.2 million.

In the first quarter of the current (1957) fiscal year, electronics procurement totaled $632.6 million, with aircraft getting $213 million; missiles, $205 million; electronics and communications, $130 million, and research and development, $66 million.

Northrop Snark to Become Operational with SAC

Air Force-Northrop Snark SM-62 5,000-mi.-range missile is scheduled to join Strategic Air Command following extensive tests at Patrick AFB, Fla. The 69-ft.-long missile is shown on Northrop-developed mobile launcher indicating it can be fired from small site. Northrop developed airframe, guidance system and ground handling equipment.

Newest Matador and its Mobile Launching Platform

Martin's newest Matador, the USAF TM-61B, was shown publicly for first time last week. It was mounted on a new mobile launcher built by Goodyear Aircraft and pulled by a tractor support unit produced by Four-Wheel Drive Auto Co. Support vehicles have large "pillow-tires," a Goodyear Tire & Rubber Co. development. TM-61B is longer than original Matador, has greater range, improved Allison J33 engine.

Electronics Reliability Is Improving, Defense Official Tells Symposium

Bright spots are beginning to appear in the military electronics reliability picture. A gratifying change from "philosophy to action" is becoming more apparent in the electronics and aircraft industries.

This hopeful note was sounded by J. M. Bridges, Director of Electronics, Office of the Assistant Secretary of Defense (Engineering) to the Third National Symposium on Reliability and Quality Control in Electronics in Washington, D.C.

Bridges said he found that emphasis on reliability in both design and manufacturing operations increased greatly during 1956.

"We haven't made reliability a definitely established science yet, but we are starting to give it equal consideration with other performance requirements in development and production," Bridges said (AMERICAN AVIATION, Oct. 22, 1956, p. 56).

He cited equipments which showed proof of the new progress through application of reliability techniques at both design and production stages.

• **An airborne digital computer** for bombing-navigation and containing 10,000 parts, including 300 electron tubes, 5,000 diodes and 96 transistors, has been developed. Its prototype operated 450 hours, some in actual bombing exercises, with only four failures—only one of which affected flight reliability.

Electron tubes for guided missiles are improving, Bridges said. The magnetron, he noted, has been historically a major source of unreliability in radar equipments. One magnetron manufacturer increased mean-time-to-failure from 45 to 500 hours, through design changes.

Another "outstanding example" of progress was in improving reliability of equipment already in production, Bridges said. This was "an airborne navigation equipment developed for the Navy" and in limited production by three contractors.

Quantity production of this item was held up because of unreliability in service tests. Flight-testing did not give a good statistical measure of unreliability, since 5,000 flight test data hours showed only nine design changes needed.

• **Operating under** simulated conditions in the laboratory, 50,000 operating hours were accumulated which indicated need for 22 design changes, Bridges said. Applying the nine changes, mean-time-to-failure was increased from 45 to 120 hours, and application of the remaining 13 should give significant increases.

This program, Bridges said, taught a "major lesson" regarding the value of simulated operating tests and saved time, money and manpower.

As a result the Navy has for the first time included a firm requirement, specified in terms of average time-to-failure together with specific details of tests, in its contractual specifications for the equipment.

AAP Acquires Two Annual Publications

American Aviation Publications, Inc. has acquired publishing rights to the *Aircraft Year Book* and *Aviation Facts & Figures*, official publications of the Aircraft Industries Association, from Lincoln Press, Inc., it has been announced by Wayne W. Parrish, president and publisher of AAP.

Fred Hamlin, former editor and publisher of the *Aircraft Year Book*, has been retained as consultant for this publication, effective Feb. 1. Eleanor Thayer Miller, who was associate editor of the year book, will become managing editor on the same date.

The 1956 edition of the year book, now on the press, will be distributed through Lincoln Press. The 1957 edition of *Aviation Facts and Figures*, now in preparation, will be published and distributed by AAP early this year.

IAS Names Two Honorary Fellows

The Institute of the Aeronautical Sciences has named two honorary fellows and made four awards for outstanding accomplishments in 1956.

New honorary fellows, highest IAS honor, are Harry F. Guggenheim, senior partner of Guggenheim Brothers, and Air Commodore F. Rodwell Banks, director of Bristol Aeroplane Co. Other awards were:

Robert M. Losey Award: Ross Gunn, U.S. Weather Bureau's director of physical research, "in recognition of outstanding contributions to the science of meteorology as applied to aeronautics."

Sylvanus A. Reed Award: Clarence L. Johnson, vice president-engineering and research, Lockheed Aircraft Corp., "for design and rapid development of high performance sub-

sonic and supersonic aircraft."

Lawrence A. Sperry Award: George F. Jude, director of flight control engineering, Sperry Gyroscope Co., "for significant contribution to the advancement of precision automatic flight control and safe all-weather flight."

John J. Jeffries Award: Ross McFarland, associate professor of industrial hygiene, Harvard University, "for outstanding contributions to the advancement of aeronautics through medical research."

AAP Names Beller Engineering Editor

William Beller, managing editor of *Aero Digest* until it ceased publication in December, joins the staff of American Aviation Publications this week as Engineering Editor, Wayne W. Parrish, editor and publisher, has announced.

Beller is a licensed aeronautical engineer. He was a senior Aerodynamicist with Hughes Aircraft Co., from 1942 to 1945; assistant director of public relations for Ford Instrument Co., from June 1952 to June 1954, and was a foreign correspondent for McGraw-Hill several months before joining Aero Digest in October 1954.

He will fill an important spot in AMERICAN AVIATION's expanding editorial organization.

Douglas' Profits for '56 Exceed $33.2 Million

Douglas Aircraft Co. reported net earnings of $33,202,000 ($8.96 a share) on record sales of $1,073,515,000 in the fiscal year ended last Nov. 30, against $28,215,000 net ($7.65) on $867,504,000 sales in the previous year.

At the end of 1956, Douglas' backlog totaled $2,232,000,000, of which $1,129,000,000 represented commercial transport contracts, and $1,103,000,000 military orders.

Directors declared an extra dividend of 50c and the regular quarterly dividend of 50c, payable Feb. 20, to stock of record Jan. 30.

Hiller Rotorcycle Makes First Flight

The Hiller XROE-1 one-man collapsible rotorcycle, being developed under Navy BuAer contract for the Marines, has made its first flight.

The craft, weighing less than 250 lbs., is designed to collapse into a small package. Assembly is with quick-release pins. It can be put together in less than 10 minutes. Power is a Nelson four-cylinder opposed, two-cycle air-cooled gasoline engine built by Barmotive Products Inc. The XROE-1 incorporates one rotor 18 ft. in diameter and a small tail rotor located on a tubular boom, compensating for torque.

Hughes' New Falcon

New version of Hughes Falcon air-to-air missile, designated GAR-1D, features slightly larger stabilizer set about 2 in. aft of fin trailing edge. Absence of rivets on fin of earlier Falcons suggests new fabrication techniques such as aluminum honeycomb or Fiberglas construction.

Royal AMPHIBIAN NEWS

Notes on America's only all-new, twin-engine, supercharged, utility amphibian . . . for business flying and charter service operation.

IF IT'S PERFORMANCE YOU WANT — ROYAL GULL SUPER 200 HAS IT!

CLIMBS FAST — FLIES HIGH —
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Climbs to 9,000 ft in just 7 minutes

GETS THERE IN A HURRY —
208 mph High Speed
190 mph Max. Cruise (70% Power)

GETS IN AND OUT HANDILY —
50'
1440 ft — 20% flaps — sea level
14 seconds from water with 1930 lb useful load.
1800 ft — full flaps — sea level
50'

WITHOUT BEING GREEDY!
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Cruise Range

PLUS the many other SUPER 200 features. Write for Bulletin RG-200.

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Fairchild Must Sell 80 F-27s to Break Even

Fairchild Engine & Airplane Corp. reportedly estimates its break-even point on the F-27 Friendship at 80 aircraft. Company anticipates that the big break on sales of the Fokker-designed turboprop transport will be after the aircraft enters service.

Latest information indicated that the first F-27s will be flying in scheduled service in the late winter or early spring of 1958. To date, Fairchild has firm orders for about 30 aircraft.

Jonco Aircraft Co., Fairchild's wholly-owned subsidiary, will produce F-27 tooling and main components at its Shawnee, Okla., plant. Main assembly will be at Fairchild's Hagerstown, Md., plant, where two aircraft are expected to be completed about year's end. At that time another seven F-27s will be in an advanced stage of manufacture.

• **Meanwhile, Fokker reports** from Amsterdam that the first prototype of the Dutch-built Friendship has completed 325 hours of test flying "without any serious trouble" since its initial flight Nov. 24, 1955.

Grumman Will Produce Frye Safari If . . .

The Frye F-1 Safari transport will be produced by Grumman Aircraft Engineering Corp. if the Frye Corp. can raise $15 million to establish an assembly line and start production. A conditional contract was signed in late December.

A 60-day provisional agreement between Frye and Fairchild Engine & Airplane Corp. for tentative production of the four-engine F-1 at Jonco Aircraft Corp., Fairchild's Shawnee, Okla., subsidiary, was terminated by Fairchild in November when it was determined that Frye could not meet financing provisions.

AA's Profit for 1956 $19.5 Million; Tops '55

American Airlines showed 1956 earnings of $19,573,000 ($2.44 a share) compared with 1955 net of $18,609,281 ($2.42) in 1955. The 1955 figures are preliminary and unaudited.

C. R. Smith, president, said earnings for the first three quarters of 1956 were ahead of the same 1955 period, but that the fourth quarter was lower because of increased operating cost and a reduction in operating factor due to bad weather.

He said it was entirely unrealistic for the airlines to try to meet the costs of 1956-57 with a fare structure of 15 years ago, and that CAB should authorize rates which recognize the increased cost of doing business.

The 1956 earnings include $1,549,000 profit after taxes from sale of property whereas in 1955 this item amounted to only $277,937. Last year's revenues totaled a record $291,452,866, of which $260,812,697 was from passengers. Expenses were $273,428,778, the major items being $131,309,975 ground expense and $103,916,737 direct flight cost.

Urge End of Mexican Airline's L.A. Rights

The Los Angeles Chamber of Commerce has asked the Civil Aeronautics Board to suspend or revoke the Los Angeles terminal rights of Compania Mexicana de Aviacion until the Mexican government grants reciprocal rights to a U.S. carrier to operate direct Los Angeles-Mexico City flights.

The chamber's unprecedented petition pointed out that CMA has enjoyed a 10-year monopoly in serving Los Angeles. It said west coast residents are now required to travel devious routes via Houston or New Orleans if they desire to fly to Mexico City on a U.S. line.

CAB in 1946 certificated Western Air Lines for the direct route, but the company has been denied landing rights at Mexico City. CMA received route authority from CAB in 1947, and the chamber said it was granted with the understanding that a U.S. carrier would receive similar privileges.

WAL president Terrell C. Drinkwater, praising the chamber's "direct action," said his company can start daily DC-6B service on the 1,555-mile route "in a very short time" if rights are granted by the Mexican government. WAL would also consider the route ideally suited for operation of Lockheed Electra turboprops to be delivered in 1959, he added.

News Briefs

MANUFACTURING—MILITARY

• **Resignation** of Dr. C. C. Furnas as Assistant Secretary of Defense for research and development was accepted by President Eisenhower, effective Feb. 15. Furnas will return to his post as chancellor of the University of Buffalo.

• **Bendix Aviation Corp.** reported earnings of $24,278,263 for the fiscal year ended last Sept. 30, compared with $25,888,599 profit in the previous year. Net sales, royalties and other operating income totaled $581,418,734 against $567,249,923 in 1955. One reason cited for decreased profit was inability of the company to absorb quickly in its sales prices, and through cost-reduction programs, the added cost of new labor contracts.

• **Charles Joseph McCarthy,** board chairman of Chance Vought Aircraft, was named to a five-year term as a member of the National Advisory Committee for Aeronautics. He succeeds Arthur E. Raymond, v.p. and engineering director of Douglas Aircraft, whose term expired.

• **Cornell Aeronautical Laboratory** resumed operation of its 1,000-mph windtunnel following completion of a five-month $2,225,000 modification program. The 32,000-hp tunnel can test planes, missiles and propellers at speeds up to 1.3 times the speed of sound.

TRANSPORT

• **James H. Cobb** resigned as assistant v.p. and advertising director of American Airlines and will join Burke Dowling Adams on Feb. 1 as v.p. and general manager of the New York City office (3 E. 45th St.) which the advertising agency will open on Mar. 1. BDA also has offices in Montclair, N.J.; Atlanta, Ga, and Panama.

• **Trans-Canada Air Lines** will equip its Viscount fleet with automatic pilot systems made by Collins Radio Co. Initial order was for 18 AP-101 systems and spares.

• **American Airlines** took delivery of the first of four DC-6 and DC-7 procedural trainers developed for it by Burton Rodgers Technical Training Aids Inc., Cincinnati. Trainers are designed to handle cockpit procedural and emergency training for such operations as engine starting, fuel management and systems operation.

Late Personnel Changes

BLAKLEY

MURRAY

SCHILT

McCAUL

William A. Blakley, chairman of executive committee of Braniff Airways' board of directors and that company's largest stockholder, appointed to U.S. Senate to fill seat vacated by **Price Daniels** (D. Tex.).

Robert B. Murray, Jr., former Undersecretary of Commerce for Transportation, elected executive v.p. Pacific-Alaska Div., Pan American World Airways, succeeding **C. M. Young,** who has retired but remains a vp on part-time basis.

Lt. Gen. Christian F. Schilt retires April 1 as Assistant Commandant of Marine Corps for Air and Director of Aviation, will be succeeded by **Maj. Gen. Verne J. McCaul,** now commanding Fleet Marine Air Force in Atlantic.

Leo Seybold, assistant public relations director United Air Lines, named assistant to president of Air Transport Assn. in charge of federal affairs.

The brilliant new Bristol Britannia has been ordered by Northeast Airlines for early introduction into service on their routes between New England, New York and Florida.

Commercial aviation history will be made by the brilliant new Bristol Britannia—largest, fastest, quietest turboprop airliner. The Britannia offers a new world of operating efficiency . . . a new world of passenger luxury.

The largest airliner. The largest passenger aircraft flying, the Britannia carries passengers in whispering luxury. Her massive majesty adds a new wealth of prestige to operator companies.

The most economical airliner. The Britannia displays an amazing thriftiness on medium and short hauls . . . carrying up to 133 passengers *at a cost of less than one cent per seat mile.*

The most versatile airliner. The Britannia fits with consummate ease into existing traffic patterns—and with her swift, smooth cruising speed of 400 m.p.h., her journey-times on medium and short hauls match those of the pure jets—at two-thirds the cost.

Airport facilities are no problem to the Britannia. She can

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NG GIANT"

perate from existing runways throughout the world. From 6000-foot runway she can lift a 28,000-lb. payload *plus* fuel for a 2500-mile sector, with full allowances and reserves.

The quietest airliner. Externally and internally the Britannia is the quietest airliner flying. Her passengers enjoy an exhilarating experience of hushed, gentle travel. And official airport noise-level tests show that the four quiet but powerful Proteus turboprop engines of the "Whispering Giant" decisively solve the noise-nuisance problem.

The most tested airliner. The Britannia has been more thoroughly pre-operationally tested than any airliner ever before. Her structure has undergone over 54,000 simulated flying hours in a pressure tank . . . while her Proteus turboprop engines have been proved in more than 74,000 flying and bench hours.

She is the latest product of a company long renowned for progressive ability, achievement and reliability in aviation techniques.

BRISTOL

Britannia

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Worldwide recognition and demand. Britannias have been ordered by: Northeast Airlines • British Overseas Airways Corporation • El Al Israel Airlines • Canadian Pacific Airlines • Hunting-Clan Air Transport • The Royal Air Force.

ARMY COMPLAINTS about inadequate troop and cargo airlift support from USAF will be heard during defense appropriations hearings. Fiscal 1958 aircraft procurement budget makes no provision for new transports. Restrictive research and development funds are expected to result in further stretchout of Douglas C-132 turboprop program. Army will find this hard to swallow. The big transport is said to have overseas payload capability of 100,000 pounds.

Defense Dept. and USAF say Army airlift is adequate. But a further JCS study is under way and Army is certain to take its case before Congress.

•

MARINE CORPS' AVIATION combat strength—three wings representing an inventory of about 1,050 fighters and attack planes—will get a "new look." Chance Vought F8Us are scheduled for delivery some time this year, giving Marines their first supersonic fighter. Also coming are Douglas F4D and A4D.

Fighters will be equipped with air-to-air missiles—Sidewinders and Sparrows. Attack plane armament is classified, but Marines are known to have nuclear capability. New turboprop transport is in competition stage to replace Fairchild R4Q and Douglas R5D. It will also have a new look, because it will double as an assault transport and an aerial tanker. Best bet is an existing turboprop, probably Lockheed's C-130, specially modified for tanker use.

•

INCREASING USE of "capital preservation" devices by aircraft companies has been noted recently as interest rates rise and pressure mounts on working capital. Idea is to have an outside group finance construction of new facilities in return for a long-term lease commitment by the using company.

Latest to use the technique is Lockheed. Prudential Insurance Co. will provide $14 million in facilities at Sunnyvale and Palo Alto, Calif., in return for a 25-year lease. Convair worked out a similar deal with a San Diego syndicate for financing a central storage warehouse there. And a group of businessmen is seeking to provide facilities in Tulsa for production of the Stout Bushmaster by Hayden Aircraft Corp.

•

TOUGHER BARGAINING by military for overhaul and repair service from commercial operators may result from Pentagon order to USAF and Navy to begin putting their own overhaul and repair under industrial funds in fiscal 1958.

Pentagon officials insist the plan won't result in reduction of overhaul work contracted to commercial firms. But they concede that the new system will give military services greater knowledge of their own overhaul costs, and consequently a better bargaining position.

•

THERE'S A MAJOR CHANGE COMING in the aircraft engine industry, says Aircraft Industries Association. Future turbojets largely will be designed for specific aircraft. Volume production orders, some as large as 35,000 for a single model, will soon be a thing of the past. Production of a one-application engine probably will not be more than 4,000 engines.

20 new 420 mph turbo-prop VICKERS VANGUARDS . . .

Ordered by Trans-Canada Air Lines

PURCHASE OF 20 NEW TURBO-PROP VICKERS VANGUARDS—with an option on four more—has just been announced by Mr. Gordon McGregor, President of Trans-Canada Air Lines. Delivery will commence in the Fall of 1960. Explaining his company's action, Mr. McGregor said, "T.C.A.'s decision to order the Vanguard came after the most exhaustive equipment analysis ever undertaken by the company. The evaluation was made over a period of two years during which six other competing aircraft were thoroughly examined."

Noting the outstanding passenger popularity of T.C.A.'s fleet of Vickers Viscounts, Mr. McGregor added, "The Vanguard will have the same freedom from noise and vibration as the Viscount; it will not present any runway length or strength problems. We expect to be able to operate it at remarkably low aircraft mile and seat costs. And we are convinced it will provide the ultimate in passenger appeal and comfort."

TCA'S VANGUARD IS 2-IN-1 AIRLINER! The efficient "*double-deck*" fuselage makes the Vanguard a *full-time* money-maker. Upper deck: 102 passengers. Lower deck: *three times the freight capacity* of any similar plane—can carry the Vanguard's full 24,000-pound payload. Stage lengths up to 2600 miles. Speed over 420 mph.

EXPERIENCE HAS NO SUBSTITUTE! Into each Vanguard will be built over 2-million hours of Viscount flying experience.

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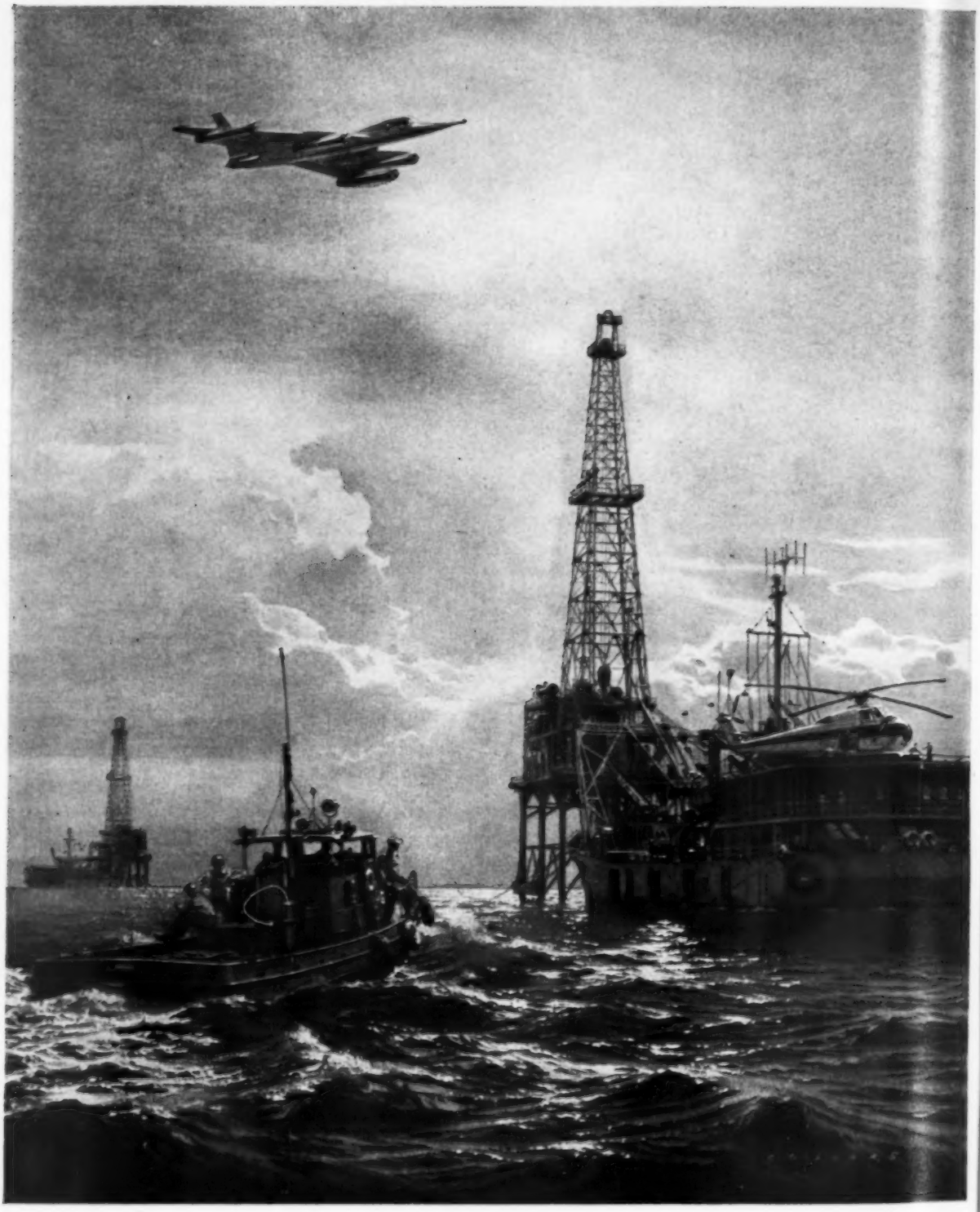

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WHEREVER MAN FLIES

HAMILTON STANDARD

Production Spotlight

• Air Force has changed its mind about a reconnaissance version of the Lockheed F-104 and has rescinded a $6.3-million order for RF-104As.

• Rohr Aircraft Corp., which designed the powerpack and nacelle strut for the Boeing 707, is scheduled to deliver the first article in June. Portions of the parts will be produced at Rohr's Riverside plant.

• Convair has developed a new design replacing the original Edison continuous fire detector secondary system in Zone 2 of the 440 Metropolitan with an improved Edison detector of the same type. Company will try it out on six aircraft delivered to various operators. Primary Edison detector system in Zone 2 is not affected by new installation.

• Air Research and Development Command hopes to extend Avro Aircraft's flying saucer development contract another two years. Canadian firm has been working on the VTO project several years, originally as a company project.

• The fiscal 1958 budget provides enough funds to purchase the remaining B-52 heavy bombers and associated equipment to equip 11 wings. This will bring the B-52 procurement to the originally programmed 500 aircraft.

• Approximately 19% of the more than 751,000 persons employed in the U.S. aircraft industry are engaged in production of engines and allied parts, according to latest AIA figures. The engine industry now has approximately 146,000 persons on its payroll. In 50 years the industry has manufactured more than a million piston engines, 90,000 jets.

• Handley Page is considering the GE T58 as a possible powerplant for the turboprop version of its four-engine Herald transport.

• Grumman has begun preliminary negotiations for license-production of the Fouga Magister jet trainer in case USAF or Navy should decide to buy the French aircraft.

• Four Republic F-105s are now in flight test at Edwards AFB, Calif., including two of the later B models which feature area rule and will be equipped with General Electric's multi-barrel Gatling-type 20-mm cannon. Republic still considers North American's F-107 a competitor, even though the latter aircraft is not a complete weapon system and its development has been restricted to three prototype models.

• Quicksilver is the name assigned to a high-capacity, long-distance air-to-ground communications development Hughes Aircraft Co. is working on for the Air Force. Name probably derives from fact that mercury (quicksilver) is an excellent information storage medium.

• German Air Force may contract its Orenda jet engine overhaul work to the BMW company (automobile manufacturer), which is anxious to get back into the aviation engine field. BMW was big engine producer during last war. Germany is to receive a large quantity of Orenda-powered Canadair Sabre 6s.

• Hughes Aircraft estimates the cost of its new lightweight two-man helicopter Model 269 can be reduced to $15,000 after manufacture of the 500th vehicle. Range of the 269 is about 170 miles or 2½ hrs.

• Lycoming now is offering what it calls the only four-cylinder engine in the 100-180-hp range. This is comparable to most six-cylinder engines, with the advantages of lighter weight and fewer working parts.

• Air Force finally has admitted that the Northrop SM-62 Snark has a range of 5,000 miles, adding that is the longest range and most accurate intercontinental missile in the free world today. Snark cruises at high altitudes at fighter speeds, delivers a priority warhead (H-bomb) supersonically. The SM-62 is in production.

• Bell Helicopter Corp. has a Navy contract to develop a new copter trainer to be used both for basic and instrument flight training. Aircraft, designated HTL-7, will follow design of HUL-1 utility model, but interior will be similar to commercial 47H. Powerplant will be 260-hp Lycoming. Navy has ordered 18, with first delivery next December.

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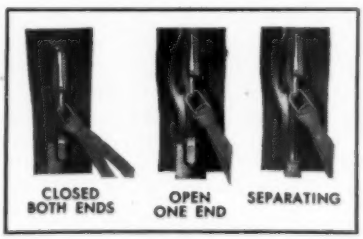
Pressure Sealing Zippers, which are made only by B. F. Goodrich, are used for air ducts, inspection ports, access doors, aileron gap seals and dozens of other uses. We're sure there's one for you.



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troop carrier) wings in the Tactical

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VOL. 20 No. 18

NEW BUDGET BATTLE LOOMS

Ike Wants $8.8 Billion for Aircraft, Missiles

President's 1958 defense budget calls for outlay of $38.5 billion in new money; $2.6 billion allocated for missiles; AF wings to be cut to 128.

A RENEWAL of the disagreement over airpower between the Administration and Democratic Congressional leaders appeared to be shaping up last week as President Eisenhower submitted his budget for fiscal 1958.

The budget message calls for a total of $73.3 billion in new money to run the entire government and includes $38.5 billion for operations of Defense Department and the three military services. The three services are listed for more than $6.2 billion in new money to buy aircraft and more than $2.6 billion for missiles.

This new obligational authority (historically the best measure of the buildup of military forces for the future) breaks down this way (in millions) for fiscal 1958 and the current (1957) fiscal year:

	Fiscal 1957	Fiscal 1958
Army	$ 7,828	$ 8,920
Navy	10,421	10,922
USAF	17,680	17,746
Secretary of Defense	652	727
Future Transmission	200	136
Special Accounts	49	49
Totals	$36,831	$38,500

However, at this year's budget briefing for the press, W. J. McNeil, Assistant Defense Secretary (Comptroller), indicated that the new obligational authority figure is no longer necessarily the best guide to future forces. He declared that because of carryover funds from previous years and reimbursable obligations (from Mutual Defense Assistance Program), the most effective way of determining the trend for the future at this stage is the money programmed for "direct obligations."

According to McNeil, the direct obligations (actual funds that will be used, rather than money voted for the year) compare this way (in millions):

	Fiscal 1957	Fiscal 1958
Army	$ 9,584	$ 9,721
Navy	10,730	11,149
USAF	18,146	18,810
Secretary of Defense	658	729
Future Transmission	200	163
Special Accounts	49	49
Totals	$39,367	$40,594

In his message to Congress, the President said the budget figures for 1958 reflect "adjustments that have been made in the contributions of the individual military departments to the four basic military missions."

Among the adjustments cited by Mr. Eisenhower are "the gradual elimination of strategic fighter wings, which are no longer considered necessary" and "a reduction in the number of Air Force tactical wings" because of the greater mobility and effectiveness of tactical aircraft and the Army's growing guided missile capabilities.

The full extent of these adjustments is still to be explained, presumably by the Joint Chiefs of Staff, when they start their testimony before the House Military Appropriations Subcommittee after Feb. 4.

President Eisenhower's message, and the subsequent amplification by McNeil, indicate that while the Air Force will, in all probability, reach its scheduled 137 wings by June 30 of this year, it will be reduced to 128 wings by June 30, 1958 as a result of the fiscal 1958 budget.

The 128 wings will include 45 in the Strategic Air Command, 32 in the Air Defense Command and 51 (including 15 heavy, medium and assault

New Authorizations and Expenditures for All Services

New authorizations and expenditures budgeted for each of the services in selected categories (000 omitted).

ARMY

	New Authorizations			Expenditures		
	1956	1957	1958	1956	1957	1958
Operation & Maint.	$2,831,019	$3,054,040	$3,400,000	$2,699,006	$2,905,000	$3,308,000
Research & Dev.	342,200	410,022	400,000	413,770	410,000	410,000
Proc. & Prod.			583,000	1,584,144	1,285,000	1,400,000

NAVY

	New Authorizations			Expenditures		
	1956	1957	1958	1956	1957	1958
Marine Corps Proc.	$290,190	$164,000	$100,000	$320,317	$250,000	$240,000
A/C & Related Proc.	905,602	1,732,900	1,932,000	1,971,741	1,765,000	1,865,000
A/C & Facilities	806,132	810,772	878,000	764,493	806,000	845,000
Proc. of Ordnance & Ammunition	185,842	294,000	256,000	292,228	225,000	300,000
Research & Dev.	474,151	507,000	505,000	449,074	480,000	500,000

USAF

	New Authorizations			Expenditures		
	1956	1957	1958	1956	1957	1958
A/C & Related Proc.	$6,286,500	$6,848,500	$6,200,000	$6,073,788	$6,096,000	$6,248,000
Proc. other than A/C	349,862	1,140,000	1,225,000	1,181,994	1,000,000	1,000,000
Research & Dev.	593,311	712,200	661,000	622,546	650,000	670,000
Operation & Maint.	3,597,496	3,742,685	4,225,000	3,652,124	4,033,000	4,135,000

troop carrier) wings in the Tactical Air Command. The 134-wing Air Force in existence on December 31, 1956 (which included one activated wing not yet manned or equipped) contained 51 for SAC, 32 for ADC and 51 (including 12 troop carrier) wings for TAC. (This shows an increase in troop carrier wings from the 11 in the 137 wing program to 15 in the 128-wing force.)

• **One other point** stands out sharply as a consequence of the 1958 budget: Air Force obviously fell short of its budget request by several billion dollars.

During last year's budget hearings, both Air Secretary Quarles and AF Chief of Staff Twining indicated the 1957 budget was austere and they were supporting it only because of expectations USAF would get billions more in fiscal 1958. At that time, Twining said:

"In order to maintain the 137-wing force we are talking about today, we will require considerably more money in fiscal year 1958 . . . It is going to take something around $18 to $20 billion a year to operate and maintain this force. If that is not forthcoming, we are going to have to change the force. The (Joint) Chiefs still feel that 137 wings is the force we should have."

Quarles simultaneously said that if the nation is to continue to support 137 Air Force wings, "there is no escape from a larger budget in fiscal year 1958 than the one we are submitting this year."

It appears obvious that Democrats, especially individuals like Sens. Stuart Symington of Missouri and Henry M. Jackson of Washington, will not let the 128-wing force go unchallenged.

In his budget briefing, McNeil indicated how the new obligational authority, direct obligations and expenditures will be divided for aircraft, guided missiles, research and development and other categories. The figures are in millions.

New Obligational Authority

	Total	Army	Navy	USAF
Aircraft	6,232	82	1,631	4,519
Missiles	2,646	425	428	1,793
R&D	1,651	400	505	661

Direct Obligations

	Total	Army	Navy	USAF
Aircraft	7,343	124	1,696	5,553
Missiles	2,828	673	465	1,690
R&D	1,661	400	505	671

Expenditures

	Total	Army	Navy	USAF
Aircraft	6,737	109	1,645	4,983
Missiles	2,039	562	264	1,213
R&D	1,580	410	500	670

According to McNeil, the 1958 direct obligations figures will result in the purchase of 470 planes for the Army, 1,220 for the Navy and 1,515 for the USAF. He also indicated that the figures for R&D are only a partial measure of the research efforts of the three services.

He placed 1957 obligations for research, development, testing and evaluation (which would include money from other accounts than R&D) at $5.2 billion and estimated them for 1958 at $6 billion. The 1957 breakdown includes $1,052 million by the Army, $482 million by the Navy, $2,725 million by USAF and $135 million by the Defense Secretary's office.

In an effort to reflect the three-year trend of orders by the three services for aircraft, guided missiles and R&D, McNeil also provided some data on direct obligations in millions for fiscal 1956, 1957 and 1958.

Direct Obligations

	Total	Army	Navy	USAF
1956				
Aircraft	7,736	121	1,980	5,635
Missiles	1,630	439	222	969
R&D	1,540	404	496	640
1957				
Aircraft	7,010	88	1,660	5,262
Missiles	3,071	743	440	1,888
R&D	1,681	418	514	681
1958				
Aircraft	7,343	124	1,696	5,553
Missiles	2,828	673	465	1,690
R&D	1,661	400	505	671

Proposed Air Force Budget

Aircraft and Related Procurement

	1956	1957	1958
Aircraft and related procurement	$5,543,087,150	$5,374,841,329	$5,688,160,000
Guided missiles	862,810,162	1,558,102,393	1,406,150,000
Contract technical services	19,251,000		
Industrial mobilization	19,586,967		
Procurement administration	84,240,358		
Department of Army spares support	9,304,528	43,536,784	
Aircraft ground-handling equipment	23,164,127	54,571,755	51,000,000
Guided missiles squadron and depot equipment	106,421,922	64,546,946	5,700,000
Ground support equipment	11,479,615	4,000,000	3,000,000
Total direct obligations	6,679,345,838	7,099,599,207	7,154,000,000
Reimbursable obligations:			
Aircraft and related procurement	429,502,932	122,023,389	38,000,000
Total obligations	7,108,848,770	7,221,622,596	7,192,000,000

Procurement Other than Aircraft

	1956	1957	1958
Weapons, ammunition, and propellants	$288,573,133	$134,088,000	$121,300,000
Vehicular equipment	21,156,757	42,978,000	49,500,000
Ground communication-electronic equipment	344,600,720	507,627,000	436,900,000
Ground handling equipment	41,369,680	343,045,000	379,000,000
Training equipment	58,491,166	59,735,000	78,900,000
Support equipment and supplies	21,724,854	167,508,000	194,800,000
Base maintenance equipment	18,171,133	27,183,000	36,000,000
Airborne electronics and communications equipment	132,723,723	42,374,335	28,600,000
Contractor technical services	700,000		
Total direct obligations	927,511,166	1,324,538,335	1,325,000,000
Reimbursable obligations:			
Weapons, ammunition, and propellants	52,100,706	22,000,000	5,000,000
Vehicular equipment	13,134,401	21,000,000	6,000,000
Ground communication-electronic equipment	208,333,183	72,000,000	21,000,000
Ground handling equipment	26,033,316	16,000,000	6,000,000
Training equipment	6,853,609	15,000,000	3,000,000
Support equipment and supplies	25,219,864	12,000,000	4,000,000
Base maintenance equipment	17,383,618	8,000,000	5,000,000
Total reimbursable obligations	349,058,697	166,000,000	50,000,000
Total obligations	1,276,569,863	1,490,538,335	1,375,000,000

Research and Development

	1956	1957	1958
Aircraft and related equipment	$187,889,610	$138,251,972	$142,940,000
Guided missiles and related equipment	73,279,983	91,327,081	76,412,000
Ammunition and related equipment	10,273,906	10,080,298	8,766,000
Other equipment	71,714,084	93,379,322	60,506,000
Military sciences	69,018,484	58,413,330	59,376,000
Operations and management	227,826,493	289,511,444	323,000,000
Total obligations	640,002,566	680,963,447	671,000,000

The President's budget message declared that overall expenditures in 1958 will be up about $542 million over the current year. He pointed out that spending for guided missiles will be up 35%, for ship construction up 12%, for aircraft procurement about the same and for other types of procurement there would be a 2% drop. According to Mr. Eisenhower, Defense Department expenditures (not obligations) compare this way (in millions) for the three years:

	1956	1957	1958	Oblig. Authority Recommended for '58
Aircraft	7,146	6,786	6,737	6,232
Missiles	1,168	1,506	2,039	2,646
R&D	1,495	1,540	1,580	1,651

The President was careful to point out that the extra $900 million voted by Congress for aircraft and related procurement and for R&D for fiscal 1957 had reduced the AF's needs for 1958. "The new obligational authority needed for the Air Force procurement program for the fiscal year 1958 is less than it otherwise would have been because of the additional appropriations for this purpose voted by Congress last year.

"Together, these appropriations will provide sufficient funds for Air Force aircraft and related procurement in the current year and in fiscal 1958," the President said.

Other highlights of the 1958 budget message:

- Next year's Mutual Security program involves $1,406,517,000 in materiel to be delivered to allies from U.S. service stocks. Army will provide $264,900,000 worth of equipment, Navy $124,317,000 and Air Force $1,017,300,000.
- The Atomic Energy Commission will spend $91 million on development of aircraft propulsion reactors in 1958. The 1957 and 1956 figures were $89,550,000 and $49,604,202, respectively.
- It was officially indicated that nuclear reactors are being developed to propel guided missiles. AEC's efforts, the message said, will be to continue to develop reactors for the Defense Department, "including propulsion reactors for submarines, surface combatant ships, and military aircraft and missiles and transportable plants for the generation of heat and electric power at remote military installations."
- AEC's $8-million program involving construction and plant acquisition for reactor development will cover the completion of "certain previously authorized projects connected with the development of military aircraft propulsion reactors."
- Navy's $1,506,405,000 shipbuilding program involves a nuclear-powered aircraft carrier and guided missile launching ships.
- The Defense Department is programming $100 million to put the Military Air Transport Service on an industrial fund basis, thereby enabling

Army Aviation Budget

Research and Development

	1956	1957	1958
A/C & Related Equipment	$15,768,843	$12,500,000	$14,354,000
Guided Missiles and Related Equipment	111,953,992	108,985,000	87,380,000

Procurement and Production

	1956	1957	1958
Major equipment	$866,718,403	$585,000,000	$513,000,000
Ammunition and guided missiles	901,187,728	931,000,000	781,000,000
Industrial mobilization	125,622,968	139,000,000	100,000,000
Total direct obligations	1,893,529,099	1,655,000,000	1,394,000,000
Reimbursable obligations:			
Major equipment	13,465,168	135,000,000	80,000,000
Ammunition and guided missiles	113,407,767	110,000,000	70,000,000
Industrial mobilization	3,318,920		
Total reimbursable obligations	130,191,855	245,000,000	150,000,000
Total obligations	2,023,720,954	1,900,000,000	1,544,000,000

Naval Aviation Budget

Aircraft & Related Procurement

	1956	1957	1958
Aircraft and related equipment	$2,013,107,688	$1,611,441,500	$1,656,899,000
Missiles, drones, and related equipment	118,293,310	233,908,500	236,817,000
Training equipment	7,308,913	25,000,000	16,644,000
Aircraft modernization	23,650,888	93,000,000	94,640,000
Ground electronic and detection equipment	26,309,130	31,650,000	24,000,000
Total direct obligations	2,188,669,929	1,995,000,000	2,029,000,000
Reimbursable obligations:			
Aircraft and related equipment	51,134,426	45,558,500	41,195,000
Missiles, drones, and related equipment	42,210	1,091,500	
Ground electronic and detection equipment	180,800	3,350,000	
Total reimbursable obligations	51,357,436	50,000,000	41,195,000
Total obligations	2,240,027,365	2,045,000,000	2,070,195,000

Procurement of Ordnance & Ammunition

	1956	1957	1958
Ammunition	$114,332,487	$131,987,000	$120,750,000
Ordnance equipment	15,490,253	19,964,000	13,884,000
Ordnance guided missiles	87,599,027	168,049,000	205,366,000
Total direct obligations	217,421,767	320,000,000	340,000,000
Reimbursable obligations:			
Ammunition	53,787,864	6,845,000	3,300,000
Ordnance equipment	2,450,733	5,459,000	1,700,000
Ordnance guided missiles	6,594,616	45,696,000	45,000,000
Total reimbursable obligations	62,833,213	58,000,000	50,000,000
Total obligations	280,254,980	378,000,000	390,000,000

Research and Development

	1956	1957	1958
Aircraft and related equipment	$148,528,738	$131,369,416	$118,922,000
Guided missiles and related equipment	95,226,874	146,219,035	167,963,000

MATS to charge its military "customers" for services.

Active aircraft inventory will drop from 42,650 in June 1956 to 41,219 in June 1958. Army will rise from 3573 to 5031, Navy goes from 12,317 to 11,790 and AF slides from 26,760 to 24,398 over the 24-month period.

• Defense Department, which was voted $85 million as an emergency fund for R&D purposes in 1957, is asking an identical sum for fiscal 1958. Of the 1957 appropriation, $15 million already has been transferred to Navy R&D, $2.2 million to USAF R&D and $22,500 to Army R&D. Any part of the remaining $67,777,500 that is not assigned to one of the services for research by June 30, 1957 will lapse to the Treasury Department.

• The Army, which has been living off the Korean War surplus for several years and has received no new money, has requested $583 million for procurement and production purposes.

AF Negotiates $½ Billion In Missile Contracts

More than half a billion dollars worth of cost-plus-fixed-fee contracts have been negotiated by USAF with three of the 16 companies engaged as prime contractors on the Atlas, Titan and Thor ballistic missiles.

Contracts were: The Martin Co., $358 million for "design fabrication and testing" of the Titan airframe; Convair, $145 million for similar work on the Atlas airframe; Douglas Aircraft Co., $67.5 million for fabrication and testing of the Thor mid-range missile airframe. None of the funds are to be used for development of engines, guidance or other components.

All three contractors were conducting their development programs on the basis of letters of intent prior to the award of contracts. A USAF spokesman said the contract figures are merely rough estimates and do not give a realistic picture of the size of the various projects.

National Aircraft Show Canceled for 1957

The National Aircraft Show for 1957 has been canceled.

The Air Foundation issued the following statement: "A memorandum recently issued by the Defense Department precludes major participation by the armed services in a national air show, therefore no show will be held in 1957."

AF Awards Contracts Totalling $254 Million

Several big contracts for aircraft and engines, totalling approximately $254 million, were awarded recently by USAF. They include:

Ford Motor Co., Dearborn, Mich., three contracts totaling $137,159,416 for follow-on production of J57 turbojet engines and for additional J57 production facilities.

Wichita Div. of Boeing Airplane Co., $46,568,640 to manufacture B-52D intercontinental bombers.

Convair, $70,200,000 for J75-powered F-106A interceptors. The award follows $146 million in contracts previously placed for the supersonic delta-wing plane. Convair also announced a $74 million follow-on contract for continued production of J57-powered F-102A interceptors.

Bell Gets $3 Million Order for Copters, Parts

Bell Helicopter Corp. has received an Army order of over $3 million for 84 H-13H helicopters and spares. Army had previously ordered 105 of the helicopters for use as liaison and training craft.

Deliveries of the 84 will start next October and continue through October, 1958. The H-13H is powered by a 260-hp Lycoming engine.

AF Drops Martin's TBX Tactical Bomber

The Martin Company's project to develop the highly supersonic TBX tactical bomber has been abandoned by USAF, eliminating the last of the three "next generation" manned aircraft for which competitions were ordered in August, 1955.

Thus, Tactical Air Command now has no advanced combat aircraft under development beyond the Republic F-105 and the North American F-107 fighter-bombers.

Conflicting reasons have been offered for USAF's decision to scratch the Mach 2-plus light bomber: (1) a pinch on research and development funds and a belief that missiles, specifically the Douglas Thor, could accomplish the missions which the aircraft would perform: (2) the action may be a prelude to an even more ambitious manned aircraft development program.

In addition to the TBX, USAF in 1955 had ordered design competitions for an advanced fighter bomber (FBX) and a long-range interceptor (LRI). North American and Republic were selected for FBX design studies, while Lockheed, Northrop and North American were picked for LRI. Competitions were abandoned before award of Phase II contracts.

Wilson Authorizes Army-Navy Turboprop

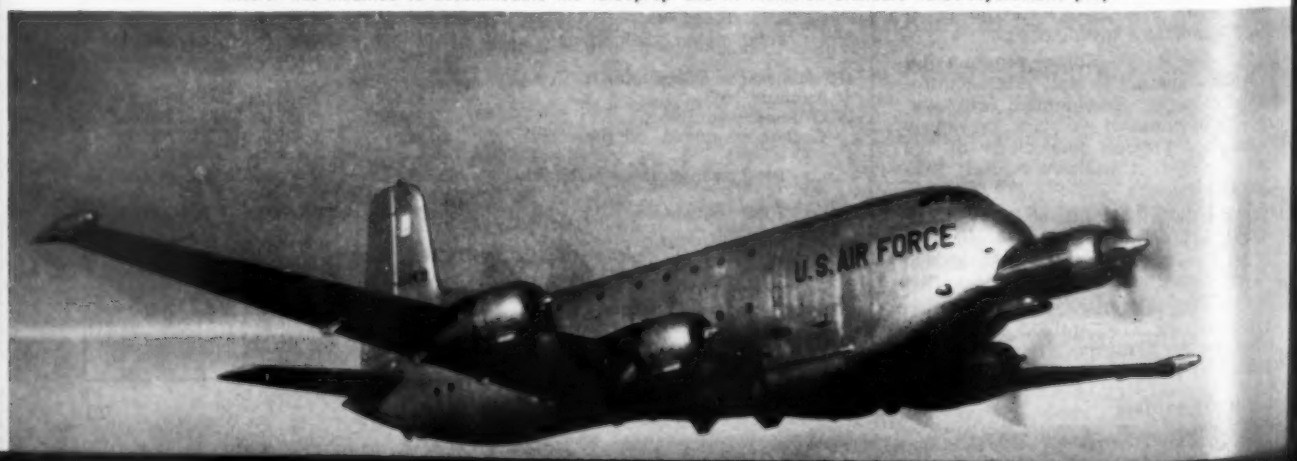
The Army has been authorized by Defense Secretary Charles Wilson to continue its joint project with the Navy to develop a twin-turboprop high-performance observation plane in excess of the 5,000-lb. empty weight limitation on Army fixed-wing planes.

Proposals for the plane have been received from nine manufacturers. A decision is expected within two months, the Army said.

Army was authorized to procure five of the aircraft for engineering and service tests. It is understood the plane will weigh about 9,000 lbs. and have short takeoff and landing capability.

Pratt & Whitney Uses C-124 as Testbed for T57 Turboprop

An Air Force Globemaster has been modified to fit a Pratt & Whitney T57 turboprop into its nose for test purposes. T57, derived from P&W's twin-spool J57 purejet, is slated to power the four-engine Douglas C-132 intercontinental transport. Entire forward section of Globemaster was modified to accommodate the turboprop and its Hamilton Standard Turbo-Hydromatic prop.



CAA Asks $385 Million for Fiscal 1958

Budget request up $40 million over 1957 fiscal year; 85% of new money would be allocated to airways and traffic control program

By LOIS C. PHILMUS

Congressional critics of previous Commerce Department slashing of CAA budgets will find little grist for the political mill in the fiscal 1958 appropriation request. A whopping $385,050,000 in new money is being asked, surpassing by $40 million the record-setting fiscal 1957 budget.

New obligational authority for the coming year actually totals $413 million when the $63 million for the four-year airport authorization is included in the calculation. ($35 million of the new money request is for liquidation of airport obligations so is not included in new obligations).

• **The big push,** started in the current year, to speed up the five-year airway plan has reached its peak, with about 85% or $323,130,000 of the total request programmed for airways and air traffic control.

The largest increase is establishment of new facilities, rising from 1957's budget of $75 million to $149,500,000. The $195 million for operation and regulation provides for $171,630,000 and includes funds for additional workload to handle increased traffic, for personnel to operate newly commissioned facilities and for operating installations formerly financed by the Air Force. Two million has been asked for airway development, as Commerce's contribution to the Air Navigation Development Board.

The operations and regulation budget also provides $19,120,000 for the Office of Flight Operations and Airworthiness. The approximate $4 million increase over the current year is "primarily for increased staff for additional workload related to certification of jet transport aircraft and their early introduction into commercial service," according to the budget request.

Spotlight on Airways, Control

But the dollar spotlight is focused on airways and traffic control. President Eisenhower, in his message, told Congress that the "capacity of the air traffic control system must keep pace" with increased traffic and coming jet operations. He revealed that the "comprehensive appraisal of emerging needs for aviation facilities" being conducted by his aide, Edward P. Curtis, "will be completed soon."

But, noting that it will set "the broad outline . . . of the future," the president declared: "In the meantime, we must install now the best available traffic control equipment and techniques to keep abreast of the growing demand."

The best available equipment in fiscal 1958 will be radar, ILS, runway approach lighting systems and new control tower equipment, as outlined in the CAA five-year plan.

• **First annual revision** of the plan will be revealed before the appropriations hearings. It has been learned that the rough $246 million estimate of the total program is now obsolete. How much higher the new estimate will be will first be told to Congress.

But the increase will reflect the installation of the Vortac short-range navigation system (not included in the original plan since the controversy was still raging) and higher equipment costs in all areas.

Significantly, the Vortac program is ready to roll. Reportedly, CAA has written specifications and just needs the money for initial hardware orders. But apparently the initial program will not have to wait for dispensation of the new budget.

The president told Congress that he will shortly ask for a $26 million supplemental appropriation for the current fiscal year to "cover the initial cost of integrating two existing short-range air navigational systems into a single system capable of meeting the navigational needs of all users of the airspace." The funds will provide for 53 Vortac facilities and 172 Tacans to convert VOR facilities to the new common system. The military, however, is expected to share the cost.

• **Optimistically,** budget planners have programmed for a total of 38 air traffic control radar beacons in 1957 and 1958. Best information available is that the beacon development has fallen behind schedule again, and procurement during the next couple of years is an unidentified blip on some planners' scope.

To offset part of the large increases in the program, CAA again will propose discontinuance of "low priority and outmoded equipment and such safety economy measures as can be accomplished without reducing the level of safety service to aviation." Presum-

Planned Navigation, Control Facilities

	Authorized through 1957	Proposed in 1958 budget
Navigation facilities		
VOR radio omniranges	580	137
Vortac navigation stations	53	18
Equipment to convert VOR to Vortac	172	54
Instrument landing system	170	30
Runway approach lights	38	64
Sequenced flashing lights	5	32
Enroute traffic control aids		
Long-range radar	32	21
Air traffic control beacon	18	20
Terminal area traffic control aids		
Airport surveillance radar	47	23
Airport traffic control tower service	211	12
Precision approach radar	23	..
Airport surface detection equipment	..	10

CAA Budget for Operations and Regulation

	1956 actual	1957 estimate	1958 estimate
Program by Activities			
1. Federal airways	$ 98,156,541	$120,484,000	$171,630,000
2. Flight operations and airworthiness	13,768,239	14,972,000	19,120,000
3. Airports	2,680,190	3,568,000	4,250,000
Total obligations	$114,604,970	$139,024,000	$195,000,000
Financing			
Comparative transfers from (—) other accounts	—2,227,991	—2,220,000	.....
Unobligated balance no longer available	263,021	.....	.....
Appropriation	112,640,000	136,804,000	195,000,000

ably, this again will call for a shutdown of low-frequency ranges and safety beacons.

The $195-million operations and regulation budget (compared to $136,804,000 appropriated for the current year) envisions an increase of more than 5,000 personnel to bring CAA's force up to nearly 25,000 people. Most of the new positions will be for controllers and airway technicians, but it also reflects CAA's bid for more safety agents and inspectors in the field to allow CAA to begin stricter enforcement of present regulations.

Liquidation Funds Sought

CAA also is asking for its second round of liquidation funds for the $231,500,000 four-year airport. Estimate for 1958 is $35 million in addition to the $30 million appropriated this year.

Also included in the CAA-proposed budget is $1,800,000 for running Washington National Airport and $1,250,000 for the Alaskan airports at Anchorage and Fairbanks. While the budget says nothing further about a revolving fund or possible sale of the Washington airport, it does note that such a fund would again be proposed for the Alaskan fields.

The issue of a second airport for Washington (celebrating its seventh anniversary) is proposed for solution by the President. Although up for hearings once more before a Senate appropriations subcommittee, the President said he would send up a $35 million supplemental request, noting that the off-again-on-again Burke, Va., site still appears to be the most suitable.

Establishment of Air Navigation Facilities

	1956 actual	1957 estimate	1958 estimate
Program by Activities			
1. Air navigation facilities—electronic and visual	$ 5,248,799	$18,600,000	$ 41,254,000
2. Intermediate landing fields	457,080	500,000	1,130,000
3. Air traffic control towers and centers	2,837,425	40,900,000	60,507,000
4. Aeronautical communications stations	879,095	4,000,000	7,307,000
5. Housing, utilities and miscellaneous	706,179	1,000,000	3,802,000
Total obligations	$10,128,578	$65,000,000	$114,000,000
Financing			
Unobligated balance brought forward	—11,659,814	—17,531,236	—27,531,236
Unobligated balance carried forward	17,531,236	27,531,236	63,031,236
Appropriation	16,000,000	75,000,000	149,500,000

Airport Aid Program

(Status of Federal aid to airport form origination through first part of four-year $231,500,000 authorization program up to 1958. Provision is made through 1959)

[Dollars in millions]

		1957 estimate		1958 estimate	
	1947 through 1956 actual	Appropriated funds	Contract authorization	Appropriated funds	Contract authorization
Airports having projects in program	1,317	80	504	20	380
Projects physically completed	2,565	140	195	60	340
Grant funds authorized	$277.3	.....	$63.0	.....	$63.0
Grant funds obligated	$229.4	$13.8	$61.2	$0.9	$75.0
Expenditures	$201.3	$15.0	$30.0	$12.5	$35.0

NACA Seeks $76.8 Million For Fiscal 1958

National Advisory Committee for Aeronautics is down for an increase of more than 20% for salaries and expenses in fiscal 1958. While Congress voted NACA $62,676,500 for this purpose for the current fiscal year—enough to cover an average of 7,982 full-time employes—the fiscal 1958 request is $76,800,000, or enough to pay for an average of 8,578 employes during the year.

The comparison of NACA's budget for salaries and expenses includes the following breakdown:

	1956	1957	1958
Aerodynamic research	$24,180,018	$27,600,000	$33,000,000
Powerplants reseach	16,200,144	17,200,000	19,600,000
Aircraft structural research	6,838,803	8,100,000	10,600,000
Operating problems research	1,781,326	2,000,000	2,100,000

NACA's 1957 $14 million appropriation for construction and equipment is nearly tripled in the new budget request. The total request is $41,484,000 and covers:

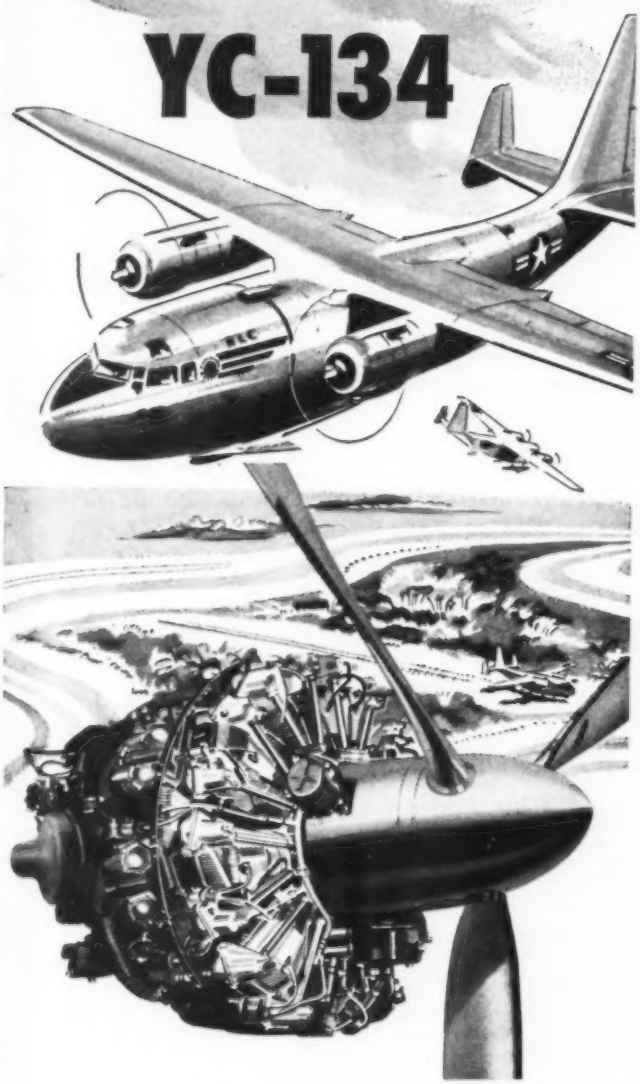
PROGRAM AND FINANCING

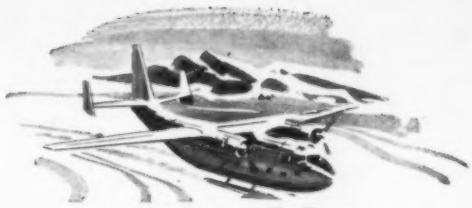
	Costs					Analysis of 1958 financing		
	Total estimate	To June 30, 1955	1956 actual	1957 estimate	1958 estimate	Deduct selected resources and unobligated balance start of year	Add selected resources and unobligated balance, end of year	Appropriation required for 1958
Langley Aeronautical Laboratory	$50,639,943	$18,248,949	$6,829,567	$4,007,513	$7,850,000	$16,605,914	$13,703,914	$4,948,000
Ames Aeronautical Laboratory	26,438,209	7,125,247	566,159	1,005,753	1,300,000	1,220,050	16,441,050	16,521,000
Lewis Flight Propulsion Laboratory	40,818,000	5,537,405	2,379,113	5,063,197	4,981,210	10,383,285	22,857,075	17,455,000
High-speed Flight Station	4,007,162	3,997,461	.....	9,701	.....	.....	.....	.....
Pilotless Aircraft Station	2,822,992	164,318	10,269	69,615	218,790	18,790	2,360,000	2,560,000
Reserves	44,953	.....	.....	.....	.....	44,953	44,953	.....
Total program costs	124,771,259	35,073,380	9,785,108	10,155,779	14,350,000	28,272,992	55,406,992	41,484,000
Relation of costs to obligations:								
(a) Cost financed from obligations of other years, net (—)			—3,435,487	.....	.....			
(b) Obligations incurred for costs of other years, net			.....	4,844,221	2,400,000			
Total program (obligations)			6,349,621	15,000,000	16,750,000			
Financing:								
Unobligated balance brought forward			—7,005,287	—13,220,666	—12,220,666			
Unobligated balance carried forward			13,220,666	12,220,666	36,954,666			
Appropriation			12,565,000	14,000,000	41,484,000			

USAF

Pantobase Boundary Layer Control

STROUKOFF YC-134





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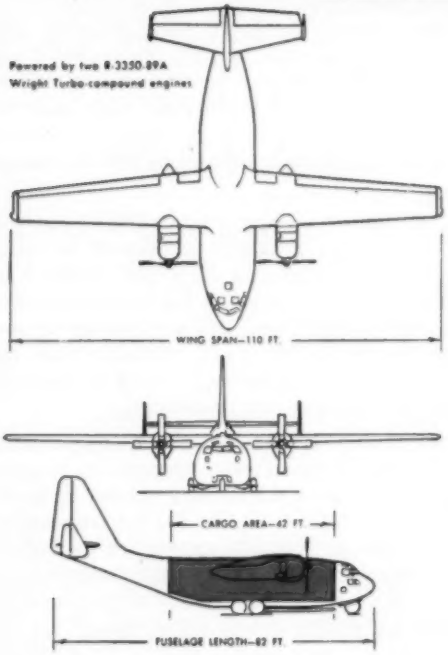

The usefulness of military transport aircraft has been extensively increased with the introduction of the Stroukoff C-134. Produced for the United States Air Force this rugged heavyweight requires extremely short take-off and landing runs and can operate from any surface – land, sand, ice, water, etc. Advanced airframe design has been combined with Stroukoff Pantobase and Boundary Layer Control Systems to produce a new type of aircraft equipped for a variety of assault and logistic missions requiring operation without the limitation of conventional runways. The Stroukoff C-134 is destined for an important role in modern military strategy.

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Piaggio Pushes Amphibian Sales in U.S.

Royal Gull, re-engined with 240 hp Lycoming, beginning to make inroads in American market; military version produced for Italian Air Force.

By JAMES HAY STEVENS

FINALE LIGURE, ITALY—The Royal Gull, the largest production executive amphibian on the U.S. market, was born in this little township on the Italian Riveria. Here, squeezed into a narrow shelf of land between the mountains and the Mediterranean, is the Piaggio plant, one of the most active components of Italian aircraft industry.

The Royal Gull was Piaggio's first postwar product, although when it came out in 1949 it was merely known by a manufacturer's designation—P. 136. The amphibian did not succeed in attracting many buyers in West Europe, where postwar finances were scarcely up to such luxuries as executive aircraft. Piaggio, nonetheless built 18 as sea-air rescue amphibians and trainers for the Italian Air Force.

Re-engining with the 240-hp Lycoming GO-435 gave the amphibian, redesignated P.136-L, a much more attractive payload and takeoff performance. It was in this form that Francis J. Trecker fell for it and signed up to import it when it had received its CAA certification with the 270-hp GO-480. This model is designated P.136-L1 and is the Royal Gull, of which 22 had been delivered to the U.S. as of this writing.

Assembled in Milwaukee

The Royal Gull is, of course, shipped to Milwaukee as a bare airframe. The engines, propellers, instrumentation, radio and interior furnishing being installed by Trecker Aircraft Corp., subsidiary of Kearney & Trecker Corp. Other P.136-L1s have been sold to several European commercial customers. The Italian Air Force is also currently receiving more amphibians of the P.136-L1 model, but equipped for rescue duties.

The Royal Gull Super 200, currently being demonstrated in the U.S., is the Piaggio model P.136-L2. It has the 340 hp supercharged Lycoming GSO-480-A1A6 and some minor airframe changes, including a small dorsal fin to absorb the increased power offset in a symmetric flight. Piaggio has undertaken to supply the Trecker Aircraft Corp. with three airframes monthly during 1957.

There is so little flat land at Finale Ligure that the completed P.136 airplanes fly first from the sea, although the flight test program is usually continued from Villanova d'Albenga airport 15 miles distant. If major adjustments are required, the airplane is landed on the sea beside the plant, but routine work is done at the Piaggio flight shed. The Piaggio plant must also be the only seaplane works without a slipway; a 25-ton crane is used exclusively for launching and recovery.

A flight in a military P.136-L1 with Commandante Aldo Gasperi, Piaggio chief pilot, revealed a good water performance in a long sea swell, almost aerobatic maneuverability, and pleasant flight-handling characteristics.

When piloting myself I found she leaped off the short, hill-girt, flint runway at Albenga—even with a tail wind on one occasion—and was easy to keep straight in the roll, with a steep climbout at 105 knots IAS. Landing was easy, with an approach at 100 kts. IAS and a steep angle which gave a fine view all the way through the flareout to the touchdown at rather under 60 kts. true. Little power is used on the approach and single-engine flight behavior is good.

The other major airframe activities at Piaggio since World War II have been: the quantity production of the Lycoming-powered P.148 basic trainer for the Italian Air Force, a real pilot's airplane and a wow for aerobatics, as I know from flying it; building the P.150 Wasp Junior-powered operational trainer, abandoned by the Italian AF for a jet model; and the evolution of the P.149 in both civil and military forms.

This latter is a neat adaptation of the P.148 trainer airframe by the insertion of a four-seat cabin section in the fuselage and recessing of the wing roots for a retractable gear—real fuselage tail and wing components are otherwise virtually identical with the earlier airplane thus cutting tooling costs.

European civil aviation proved to have little interest in the 190 mph deluxe tourer, so Piaggio offered it to Western Germany for army/air force liaison—and the *Luftwaffe* ordered it as a basic trainer! As such it is now in production from four lines at Finale Ligure, with first deliveries to Germany slated for February. License production by Focke-Wulf at Bremen, Germany, is anticipated to begin this year but Piaggio delivers all of the first 75 airplanes with Piaggio-built GO-480 power plants this year.

Apart from major trim and soundproofing differences, the military model, the P.149-D, features a completely different instrumentation and radio, also stick instead of wheel dual flight controls. It is a sturdy airplane and is cleared to CAA CAR3 standard as a five-seat utility, at 3,704 lbs. gross, and at a two-seat aerobatic loading of 3,197 lbs. gross.

Turboprop Amphibian

Forward-looking, airplane activities center on the P.155 turboprop amphibian, for which Italian government backing is forthcoming. Two models have been studied—sea-air rescue and anti-submarine—with possibilities of stretch to a civil 30-seat PBY replacement.

Design studies for this airplane have traveled through one 3,700-ehp turboprop plus jet-assist from two 1,200-lb. thrust jets to two 3,000-ehp turboprops. Most likely configuration for the prototype is a single nacelle with an Allison T-40 coaxial unit, but production airplanes are more likely to have separate nacelles with either the single-shaft Napier Eland or the two-spool Rolls-Royce Tyne.

Before World War II, Piaggio was one of Italy's major radial engine manufacturers, but today's activities are centered upon license production of flat-six Lycomings and USAF/NATO overhaul contracts on all "O" type power plants.

Production lines have already delivered 200 O-435-A motors for the Italian Air Force (as 120 complete units plus 80 spare sets) and currently a batch of 100 GO-480-B1s is going through. This latter number will be increased, but the Lycoming license is, at present, restricted to installation in Piaggio-manufactured airframes in Europe and to any other Italian airframe in Italy.

O-type overhaul contracts to date total all of six hundred, of which one-third are vertically-mounted Franklins from helicopters, which are hard-used engines. These engine contracts are not by any means all military; they come in from civil operators all over Europe and some from as far afield as Turkey and Aden.

Materials Laboratory

Piaggio has a fully equipped materials laboratory and all current test and inspection equipment. There is a closed, silenced test tower for long-period runs—they were doing a 150-hour type test on a GO-480 during my visit—and covered stands for post-overhaul acceptance runs. Piaggio-built Lycomings are fully interchangeable with U.S.-built ones and some engines are composed of 50% U.S. and 50% Italian components by the time they are overhauled.

Before the war Piaggio was Italy's principal propeller manufacturer and today the tradition is maintained with the neat little P.1000 series of three-bladers mounted in the P.136-L1 and P.149-D. This is a hydraulic constant-speed, counterweight type, shortly to be produced in feathering form.

A unique feature is the riveting of stainless-steel leading edges to the dural blades as protection against spray erosion. Propeller division manager Salvatore Mori says attachment is completely solid despite different thermal expansion coefficients.

General impression of a visit to Piaggio is of an usually well-organized plant, small but active, tailored to Italy's limited economy, but doing the lion's

share in that country's aviation exports.

In the Airplane Division, structure design and manufacturing methods are right up-to-date—with a logical bias to handwork rather than large presses because Italy has 2,000,000 unemployed and a shortage of capital.

Nevertheless, on all three production types, P.136, P.148 and P.149, interchangeability is near-perfect and it is quite a post-war record for any company to achieve production of 75% of the designs brought to flight test. It shows there must be exceptional teamwork between the acute politico-business acumen of head man Armando Piaggio, the engineering foresight of Giovanni Casiraghi, the crisp plant management of Eddy Fieschi and the soundness of Alberto Faraboschi's design work. ◈◈◈

CAB Seeks Recapture Of $7.3 Million Mail Pay

Immediate recapture of $7.3 million in mail pay received by Pan American World Airways and Northwest Airlines for 1954 transpacific operations has been proposed by CAB.

PAA would be forced to refund $5,936,000, Northwest $1,406,000. The Board started action against both lines through show-cause orders aimed at immediate revision of temporary mail rate orders. Further upward or downward adjustment is possible when final rates are established.

CAB said PAA's 1954 temporary rate "appears excessive." In that year PAA received $11,402,000 temporary mail pay for the Pacific division, of which about $5,466,000 was service pay and $5,936,000 subsidy.

PAA reported earnings after taxes in 1954 of $4,556,000, "equivalent to a 15.8% return on Pacific investment," CAB said. Its proposal would require refund of the $5.9 million subsidy, reducing PAA's 1954 total to the level of service pay.

NWA's 1954 pay "appears to have resulted in overpayment . . ." CAB stated. The airline received $4,913,000 temporary pay for the Pacific, of which $1,674,000 was service pay and $3,239,000 subsidy. Break-even need was given by the Board as $3,507,000. NWA would refund the difference between total pay and the reported break-even need.

Navy Suspends Work On Douglas Skylancer

Navy's BuAer has officially announced suspension of the Douglas supersonic F5D Skylancer.

Douglas will stop production following completion of the limited number of F5Ds provided for in the fiscal 1954 and 1955 funds. Two prototypes are being flight-tested at Edwards AFB. The plane will be brought up to production-ready status so manufacture can be resumed at any time if an emergency arises.

CAB Requests $5.7 Million in Budget For '58, $1.1 Million Increase Over '57

Increased housekeeping costs and authorization for 125 new jobs has prompted the Civil Aeronautics Board to request a record $5,725,000 for salaries and expenses in fiscal 1958.

The additional $1.1 million sought above fiscal 1957's $4,625,000 will be used for expansion in certain critical areas—primarily in safety, routes, commercial rates, field audits and international civil aviation, it was explained in the President's budget request.

For subsidy payments, Congress has been asked for $51,810,000, a whopping $35.6 million more than the $16.2 million appropriated for fiscal 1957. The difference is largely one of bookkeeping and subsidy requirements for air carriers are expected to increase only slightly.

The appropriation for 1956 was greater than obligations, while the appropriation for 1957 was less than needed. The recommended appropriation for 1958 will pick up the $4 million backlog estimated to be outstanding but unappropriated at the start of that year.

At the end of the year the appropriation balance will cover the obligations as now estimated.

How CAB Views Subsidies for 1958

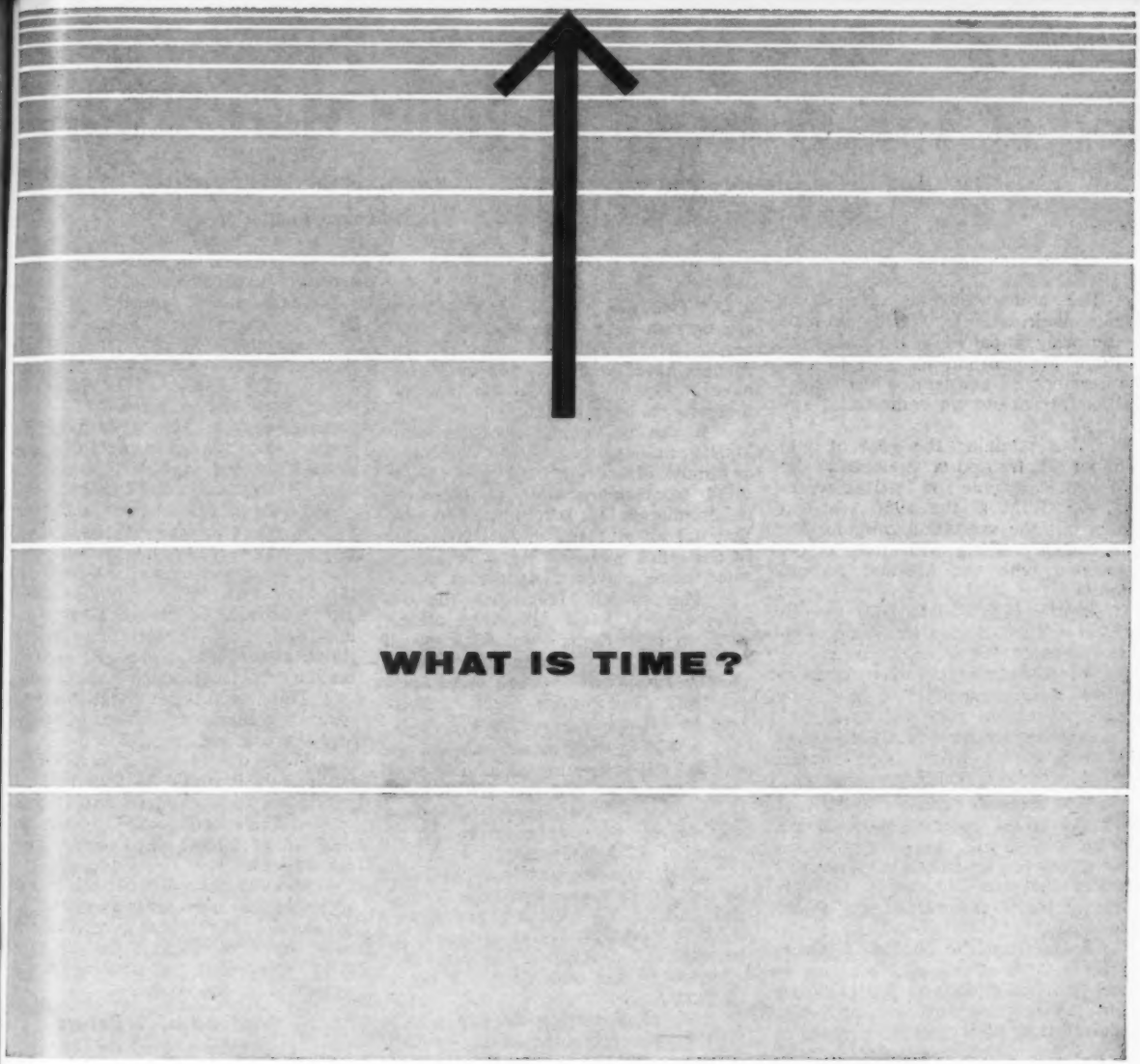
Here is the way CAB looks at the subsidy situation for 1958 under final Board action.

	Carrier units		
	Non subsidized	Subsidized	
Domestic			
Domestic trunklines	12	..	Shift of Colonial and Northeast to nonsubsidized status in 1957 will eliminate subsidy for domestic trunklines. Subsidy need for some local service carriers has declined in recent years but this has been offset by certification of new feeder and helicopter services.
Local Service operations	..	14	
Helicopter operations ..	..	3	
Territorial			
Alaskan operations	..	9	Subsidy will continue to support routes between United States and Alaska and to remote locations.
Hawaiian operations ...	..	2	
International			
Transatlantic operations	2	..	By end of 1957 subsidy will no longer be required for transatlantic and transpacific routes. Routes to Mexico and the Caribbean are also subsidy free. Subsidy for other Latin American routes will be required, although at a somewhat lower level due to improved carrier earnings.
Transpacific operations	2	..	
Latin American operations	6	3	

CAB Subsidy Payments

The following table breaks down CAB's subsidy payments for fiscal 1956, 1957 and 1958:

	1956 Actual	1957 Estimate	1958 Estimate
Program by Activities			
1. Domestic trunklines	$2,107,857	$1,162,463	.....
2. Local service carriers	23,167,895	27,068,094	$29,335,000
3. Helicopters	2,624,479	3,229,913	4,813,000
4. Alaskan operations	7,264,402	7,561,519	7,375,000
5. Hawaiian operations	131,832	284,627	283,000
6. Transatlantic operations	.....	.....	.....
7. Transpacific operations	.....	.....	.....
8. Latin American operations	779,492	7,712,418	5,880,000
Total Obligations	36,075,957	47,019,034	47,686,000
Financing			
Recovery of obligated balances ..	—5,212,795	—9,596,224	.....
Unobligated balance brought forward	4,538,028	—17,098,810	4,124,000
Unobligated balance (or excess of obligations over available balances (—)) carried forward	17,098,810	—4,124,000	.....
Appropriation	52,500,000	16,200,000	51,810,000



Anything that can be postulated is possible, says science—including *timelessness.*

The latest table-talk among the rocket and missile men has to do with the physics (and metaphysics) of photon propulsion: thrust for a space vehicle derived by shooting incredibly concentrated beams of light (photons) from its tail. Result—speeds approaching that of light! Round trips to distant galaxies could thus be accomplished in a single generation of the crew. Meanwhile, however, the Earth would have passed through a billion years—possibly into cosmic oblivion!

The space-time ratio is increasingly a factor in the calculations of a brand new field of science known as astronautics...Work in this field at Martin is already at the threshold of tomorrow.

NATIONAL ENGINEERS' WEEK
FEBRUARY 17-23, 1957
ENGINEERING...America's Great Resource

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End of Tax Write-Offs Would Hurt Airlines

ODM decision would threaten expansion programs, hit local lines hardest; orders for 400 new aircraft might have to be cancelled.

By SELIG ALTSCHUL

The ability of the airlines to finance their new jet transports may be seriously impaired if the Office of Defense Mobilization decision to end the issuance of accelerated tax amortization certificates on commercial aircraft stands.

Upon attaining the goal of 900 commercial transports previously determined as eligible for fast tax write-offs, the ODM at the 1956 year-end closed out the expansion program for this category along with four others associated with the national defense interest.

At the cut-off date, 300 aircraft valued at $558 million had been certified for rapid tax write-off, making a total of 426 aircraft valued at $516 million certified since 1951, when the write-off program goal was set.

Applications for write-off privileges that were denied involved 395 aircraft valued at $1,401,000,000.

• **As a result,** pending applications with the ODM covering most of the jets on order, will not be eligible for accelerated tax amortization. It is small wonder that the industry is strongly pressing for a reversal of the ODM decision.

Aside from the obvious necessity to build up a strong civil air arm to meet ". . . conditions of full mobilization, the military and war-supporting requirements, plus the requirements of a rock-bottom civilian economy. . ." there are a number of cogent economic and financial reasons fully justifying a continuing policy of rapid tax write-offs for new commercial transports.

Vital to Expansion

Such accelerated tax amortization played a vital role in enabling the industry to embark upon an aggressive program of equipment expansion in keeping with national objectives. It is doubtful if the air carriers could have acquired the modern fleets they have without such a program. Under the provisions of the certificates of necessity granted for this purpose the airlines are permitted to write off 80% of the cost of the aircraft in five years. Without this certificate, normal depreciation charges against a stated life of seven years would apply.

The fast write-off has been most helpful in adding to the "cash flow" of airline earnings and has made the financing of new equipment fleets possible. Capital formation from internal sources has immeasurably strengthened in this process and has been the bulwark attracting banking funds to the industry.

• **That this** is no academic theory can be seen in an analysis of the manner in which the domestic trunk air carriers have generated their cash and, most importantly, the manner in which these funds have been applied.

It can be seen that of the total $601.1 million some $323.7 million, or almost 54% of all funds, were generated from depreciation and amortization charges. (It is important to note that not all of these charges were due to the quick write-off but such accelerated items played a significant part.)

This largely facilitated the reinvestment at $486 million, or almost 81% of cash funds obtained from all sources, in the purchase of property, mostly aircraft. For this reason new debt and capital stock financing were kept to a minimum.

• **With a tight money market,** the internal self-generation of cash is more important today than ever before if the airlines are to finance new equipment acquisitions now believed to be in excess of $2.5 billion.

And financing such capital funds through other means can be a formidable undertaking. Certainly new money —from banks or investors—may not be attracted as much of the protection afforded by the cash flow will be removed.

Nor can earnings be expected to fill the vacuum caused by the removal of the rapid tax write-off. Subject to the caprice of narrow profit margins, earnings at best are now considered nominal.

Moreover, for purposes of illustration only, assuming that the fast tax write-offs amounted to $25 million last year for the domestic trunks, this would mean that these carriers would have to earn, before taxes, twice that amount additional each year, or $50 million to offset the termination of certificates of necessity.

Danger of Inflation

Logically, this could promote strong inflationary pressures in the fare structure. In other words, in order to offset the loss of the cash flow due to the rapid tax write-off abolition, fares would have to be increased to not only absorb rising costs but to compensate for the additional cash required.

The ending of the fast write-off could possibly lead to a curtailment and even cancellation of equipment purchase orders. And if denied the means of generating the necessary funds for such purposes, managements may be discouraged from embarking upon necessary expansions.

The financial predicament of the local service airlines is a case in point. Lacking any significant internal cash generation through depreciation charges and in the absence of earnings, this group finds the going difficult in attracting capital. The CAB now proposes government guarantees on equipment loans for the local service carriers. It may be doubtful that the CAB would like to extend these guarantees to the trunk carriers if it is to be consistent with a philosophy of encouraging economic self-sufficiency for the industry.

• **Considerable impairment** of capital funds would result through overstated earnings as a result of the elimination of accelerated amortization.

This would come about as replacement of equipment has been at progressive sharp increases in price.

When the time arose to replace old equipment, it would be found that depreciation reserves were grossly inadequate. This phenomenon is even now most acute in the case of the local service airlines.

Moreover, rapid write-offs promote technological advances as there is a greater incentive to acquire newer and more modern aircraft by discarding "old" equipment that is completely depreciated on the books.

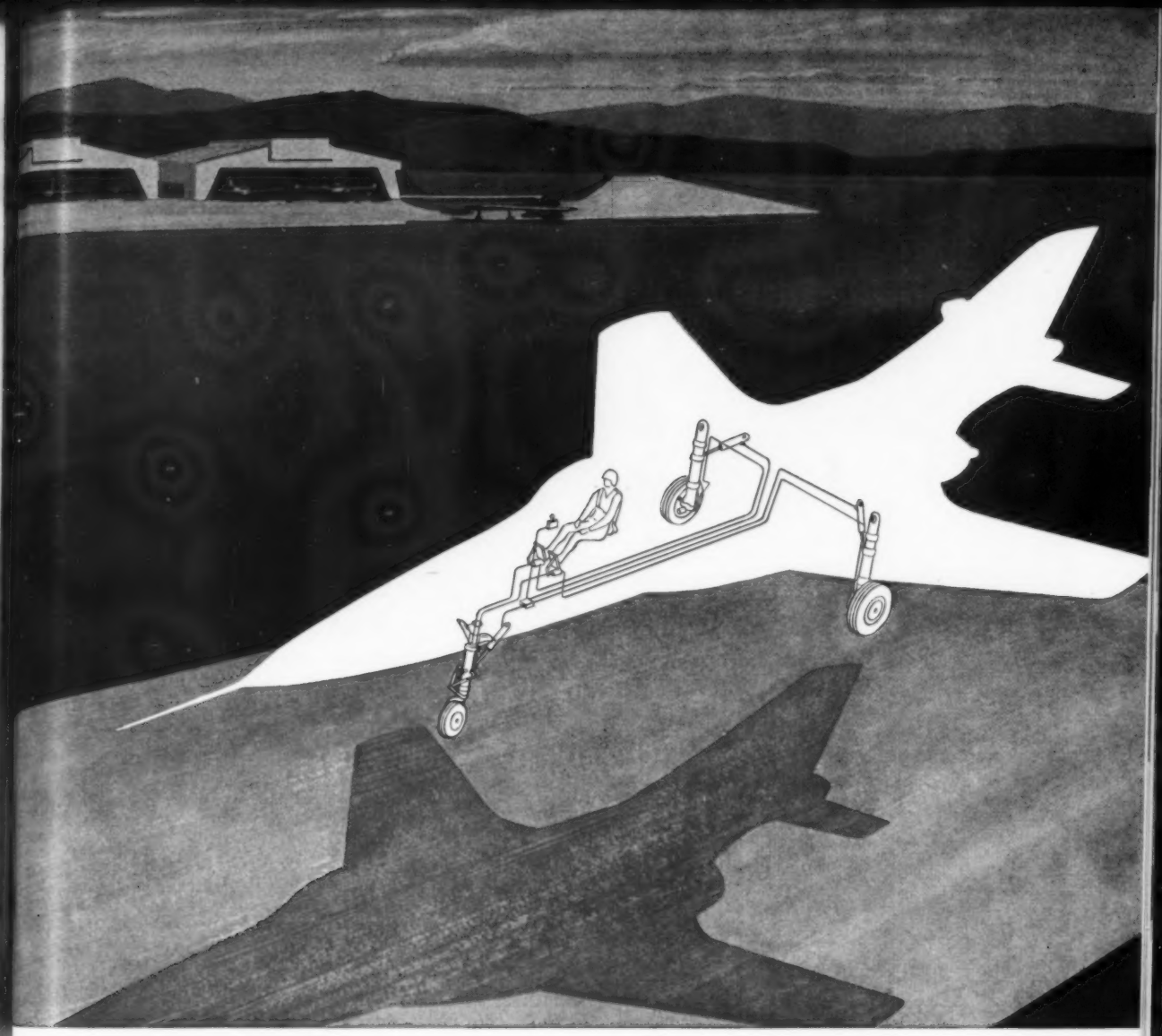
Prodded by Treasury

It is known that the ODM has been prodded in its recent action by the Treasury Department. The Treasury position in desiring to stem the loss of tax revenue through the "quickie" tax write-off is understandable. However, this is a short-range objective and narrow in its concept.

As aircraft is written off through an accelerated depreciation policy and as expansion programs are completed, the airlines will have reduced their future investment base against which charges may be assessed for tax credits.

In other words, accelerated depreciation, in a broad measure, serves to defer taxes for payment to a future date. It is not uncommon to find substantial reserves for this purpose in the balance sheets of most of the domestic trunk airlines. Accordingly, accelerated amortization by no means is to be construed as a means of tax "forgiveness."

Of over-riding importance, the instrument of accelerated amortization has proven a potent means of developing a strong civilian transport system in the national interest in the least painful manner to the Government and to the public.



FROM TOUCHDOWN TO TAKE-OFF

WITH A COMPLETE BENDIX SYSTEM FOR LANDING GEAR

During ground contact, between touchdown and take-off, the safety of the plane and crew depends upon the unfailing teamwork of everything that makes up the landing gear system. Retractor actuation, control valves, nose wheel steering, power braking, as well as wheels, brakes and shock-absorbing struts—even tires—these are the things that make up the complete landing gear system. And it is vital that all components function together with split-second accuracy and efficiency.

That is why Bendix specializes in complete and integrated landing gear systems. For, components that have been designed and engineered to work together give better and more dependable performance than any arbitrarily assembled system. The components of a Bendix landing gear system are engineered as a matched set, then tested and tuned to work together like a trained crew.

And there is a further important advantage in having one source completely responsible for production and over-all operation on the airplane.

So, when it comes to gear for landing, think and plan in terms of a complete landing gear system. Then we suggest you think of Bendix and Bendix Products Division at South Bend, Ind.

Bendix PRODUCTS DIVISION **South Bend,** IND.

Bendix
AVIATION CORPORATION

Segment of Lycoming's J57 production machining line which turns out about 350 inner and outer shrouds per month.

PRODUCTION

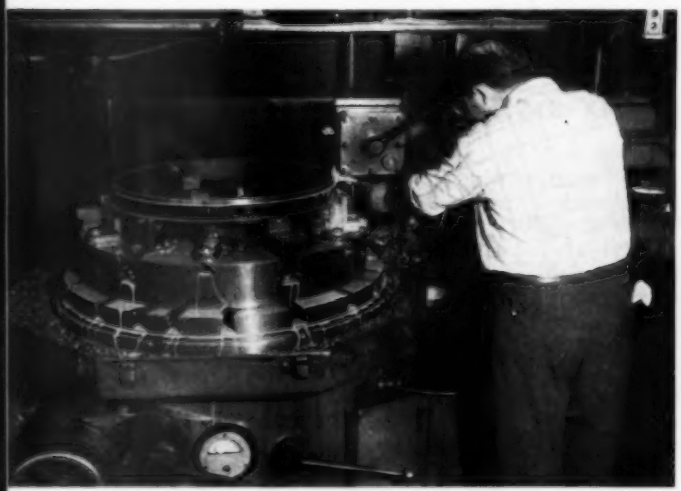
How Lycoming Mass-Produces J57 Parts

Largest capacity in the U.S. for machining jet engine shrouds is claimed by Lycoming Division, Avco Manufacturing Corp. at its Stratford, Conn. plant. In addition to meeting demands of its own T53 and T55 turboprops, Lycoming now handles subcontract machine operations for four major engine producers—Allison, Ford, General Electric and Curtiss-Wright.

Extent of company's J57 engine parts production is evidenced in its output of about 350 precision-machined inner and outer shrouds per month for Ford Motor Co.

Operations pictured here involve a variety of special machine tools to handle all stages of fabrication from initial roughing operations to final inspection.

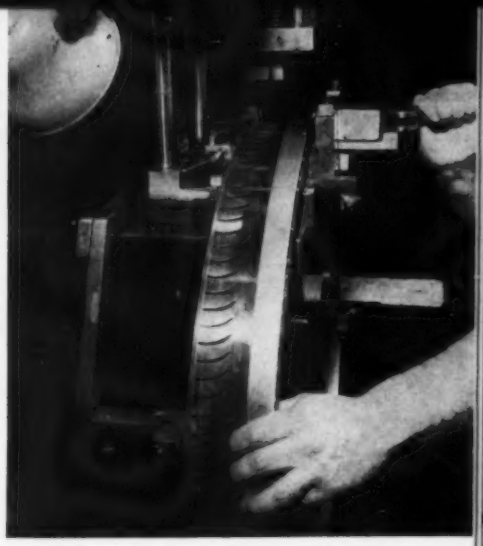
In the piercing operation alone, metallurgical research at Lycoming has enabled it to extend the life of dies 20-fold to 11,000 piercings between sharpening. Quality of the work processed by Lycoming, coupled with its rigid inspection system, has resulted in contractor acceptance of its resident inspection without additional receiving inspection upon delivery.



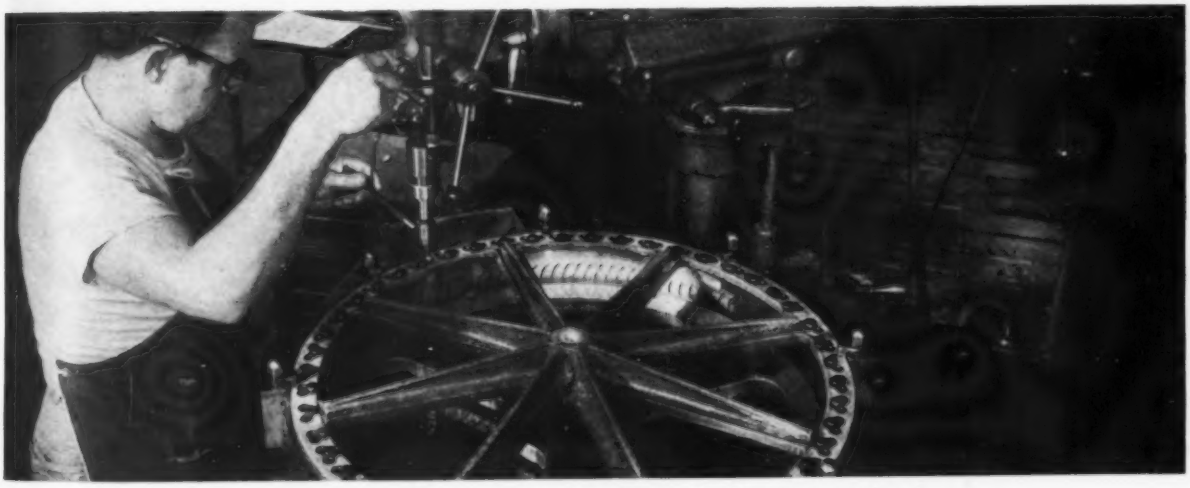
French-built Charles Berthiez vertical turret lathe handles first step of roughing operation.

Second roughing operation—tracing contour of shroud—calls for Lodge & Shipley Hydro-Trace machine.

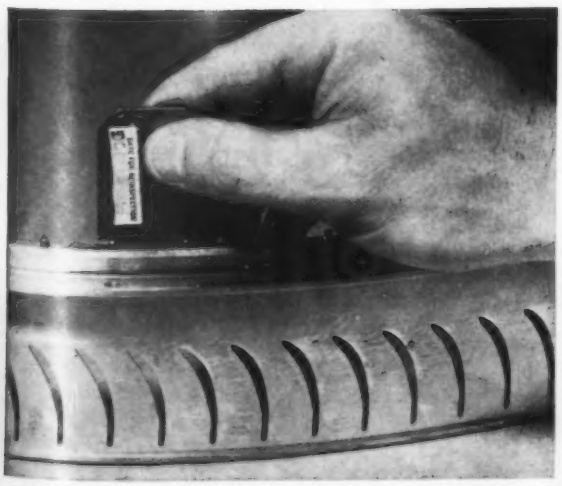
Bullard Man-Au-Trol takes shroud through complete finishing operation automatically.



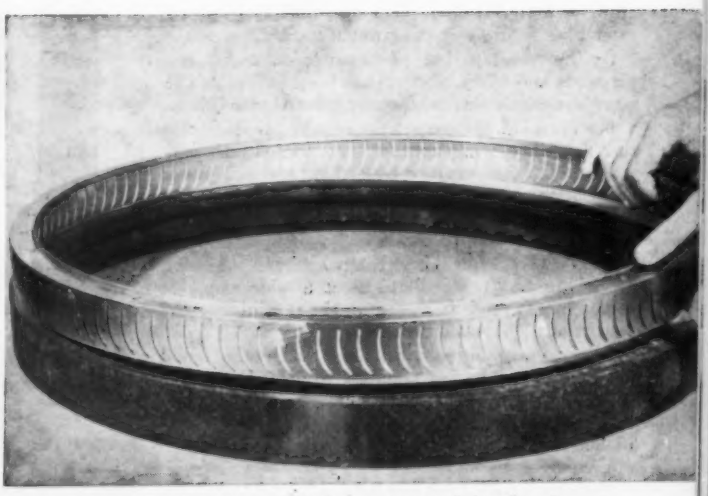
Shrouds require 130 piercings on this Niagara punch. Lycoming has extended punch life to 11,000 piercings between sharpening.



Walker-Turner radial drill is used to drill and ream 96 pinholes in each shroud.



Pins pressed into shroud are inspected with checking gauge. Diameter must be held within .001" tolerance.



J57 inner shroud before and after represented by the ring forging and finished shroud.

Bendix

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Here is the ideal protection for wiring assemblies requiring a high degree of environmental resistance without the use of metal conduit.

Scinseal, originated and developed by the Scintilla Division of Bendix*, is a multi-purpose thermo-plastic material designed to protect and seal vital wiring assemblies from every operational hazard.

By the combination of plasticizers, stabilizers, pigments and fillers, Scinseal has been formulated to meet the requirements of many adverse conditions.

For example, one usage may require low-temperature flexibility, while another is concerned primarily with a high temperature condition, and still other applications may present fuel and acid problems—or perhaps a combination of all of these characteristics is the desired result.

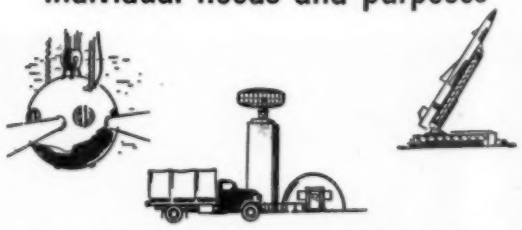
That is why Scinseal is virtually a miracle material, for it can be "tailored" to meet a wide range of requirements, and at the same time, minimize the weight of the finished product.

Scinseal can be provided in a variety of solid colors, and can be hot stamped to provide positive identification. Many electrical connector adapter molds are available, as well as the T's, Y's and variable molds necessary to provide reliable assemblies of any configuration.

Detailed information and data on Scinseal available on request.

*TRADEMARK

Can be tailored to meet individual needs and purposes



Scinseal is used in such specialized fields as underwater devices, ground radar equipment, missile control wiring.

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Collins' Withdrawal Spotlights PWI Problem

Company realized it could not meet airlines' timetable for proximity warning equipment; many technical difficulties yet to be solved.

By HENRY P. STEIER

Some basic questions apparently submerged during the early enthusiasm for anticipated early delivery of proximity warning equipment in 1958 got another go-around when the Air Transport Association met with airlines technical and operational representatives in Washington, D. C. January 28.

Execution of an about-face this month by Collins Radio Co. (AMERICAN AVIATION, Jan. 14, pp. 20) away from its plan to fill $10 million in airline orders for PWI equipment is not expected to reduce airline impatience for devices to reduce the collision hazard.

Talk of "collision avoidance" and "collision prevention" may, however, be more temperate in the light of Collins' facing up to the facts.

• **Collins summarized** its reasoning in two statements following cancellation of the airline orders. "Grave doubts" were expressed about the possibility of developing "collision detection and avoidance" equipment with available techniques in a "practical form" for airlines requirements.

On proximity warning, Collins concluded equipment cannot be developed in the time desired and would be subject to such operating limitations that its usefulness as a PWI would fall far short of airlines expectations.

History of moves to develop equipment to reduce the collision hazard began in 1946 with a study done by Airborne Instruments Laboratory, Inc. During the next ten years other studies were made, such as one by Cornell Aeronautical Laboratories. It pointed out that an "infallible airborne system (collision avoidance) would be as difficult to achieve as perfect air traffic control."

Last June Special Committee 74 of the Radio Technical Commission for Aeronautics issued its report on operational requirements for a proximity warning system calling for a PWI system as an "initial approach" to the problem.

ATA Moves Reviewed

During the past ten years the Air Transport Association followed collision prevention studies and equipment proposals closely, but the Grand Canyon tragedy in the summer of 1956 precipitated airline demands for early development of an operational system to reduce the hazard.

Subsequently the electronics industry was asked by ATA to submit proposals for equipment to an ATA technical committee. After reviewing many proposals, the Collins plan was found to be "most satisfactory" to the committee.

It called for early development of Phase I (proximity warning) equipment and concurrent research to determine if Phase II (collision detection and avoidance) equipment was practical.

The original proposal by Collins stated the hope that equipment of the Phase II system could be added as "analytical and computational" equipment to the device used for proximity detection.

Collins' willingness to push forward with development of a PWI for implementation within 12-15 months while it continued to look into the feasibility of the additional equipment was quickly accepted by the airlines.

• **Collins' proposal** called for an FM-CW Doppler transmitter using six antennas for detection of other aircraft within an 800-foot radius of the carrying aircraft. (AMERICAN AVIATION, Oct. 8, pp. 39-43.)

A panel instrument would indicate to the pilot the intrusion of other craft within any of four quadrants fore, aft, left or right. A sphere of radio frequency radiation would completely surround the aircraft.

Although detection above and below was limited to 800 feet, detection in a horizontal plane was to have had a range of two miles in any direction.

It is the further development of this system that Collins has decided to delay. In its initial report the FM-CW system proposed for its PWI was recognized by Collins as the "simplest system that will give range information directly."

• **The solution** to the collision avoidance problem was recognized by Collins engineers in their original report as being more complex than mere indication of existence of a potential collision condition.

Recognition of a collision potential involves measurement of angular position of the intruder, his relative velocity and indication of the maneuver that assures avoidance.

Key to success of producing a collision avoidance system was recognized by Collins as being the matter of air turbulence effects on the aircraft and the degrading effect of the consequent airframe movements on angle and rate of closure measurements.

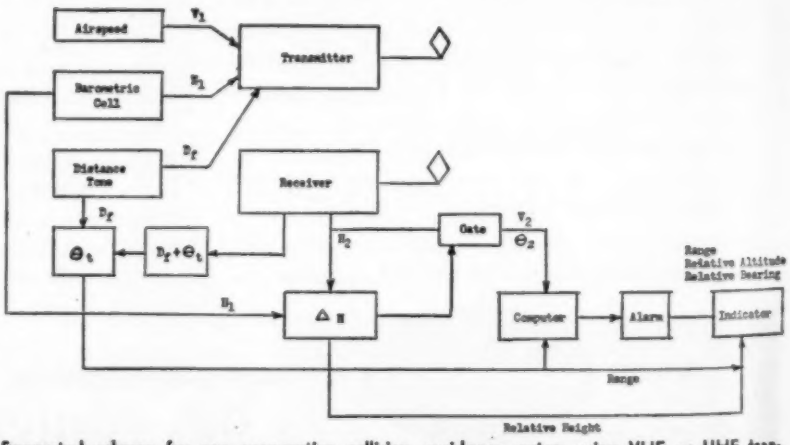
Other important factors were electronic noise, ground clutter and radar glint. The "available techniques" to handle these matters in airline aircraft have been found wanting.

Immutable Laws

The same immutable laws of physics into which Collins ran are not new in study of the collision avoidance problem. Earlier in 1956 Dr. J. S. Morrell, technical consultant to Bendix Radio, did a study on fundamental physics of the collision problem (AMERICAN AVIATION, Aug. 13, pp. 44-51.)

Results of Morrell's analysis were not encouraging. Despite the competitive situation in airline equipment development, Morrell's report was made

(*Continued on page* 45)



Suggested scheme for one cooperative collision avoidance system using VHF or UHF transceivers which compare bearing, speed and altitude readings from two sets of aircraft instruments and measure round trip transmission time to determine distance and rate of closure. Estimated are: weight—50 lbs.; size—1ATR; tubes—55; cost—$6000-$8000.

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On the nose and main landing gear of the ever larger and faster modern aircraft, Thompson Slotted Retreads provide an extra margin of safety. They are a patented tread expertly built for efficient tubeless-tire performance. They are in use by more airlines the world over than any other tread and have established an unsurpassed record of safety. By virtue of more landings per tread and more treads per casing, Thompson Retreads offer you both safety and unmatched economy.

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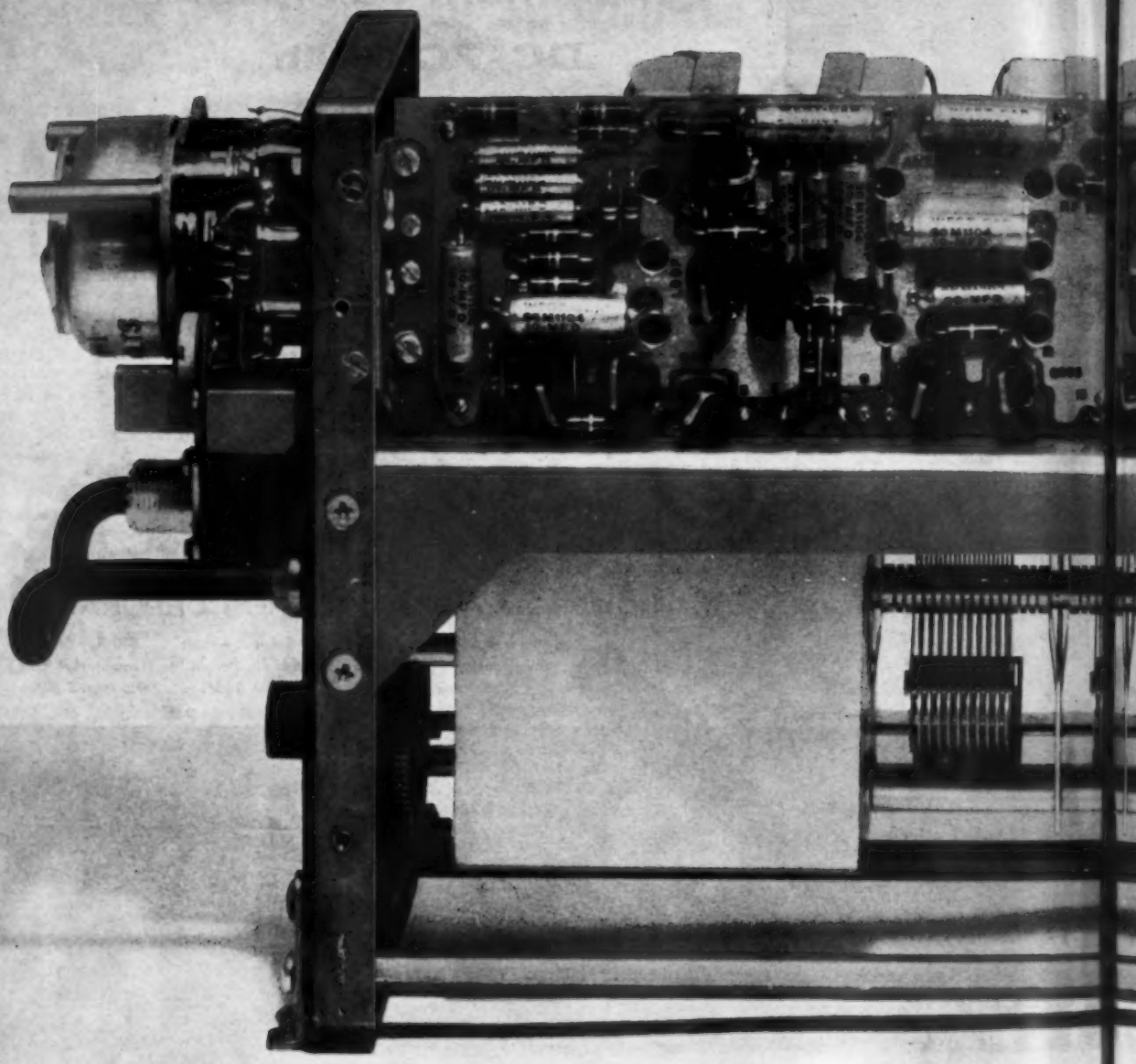

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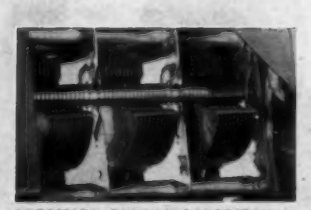

PRECISION TUNING CAPACITOR is highest quality type, heretofore found only in heaviest, costliest ADF's. ADF-100 tuning system has highest calibration accuracy of any ADF.

ETCHED CIRCUITRY contributes significantly to the ADF-100's light weight, small size, low cost, and high degree of reliability. 80% of all the circuitry in the ADF-100 is etched.

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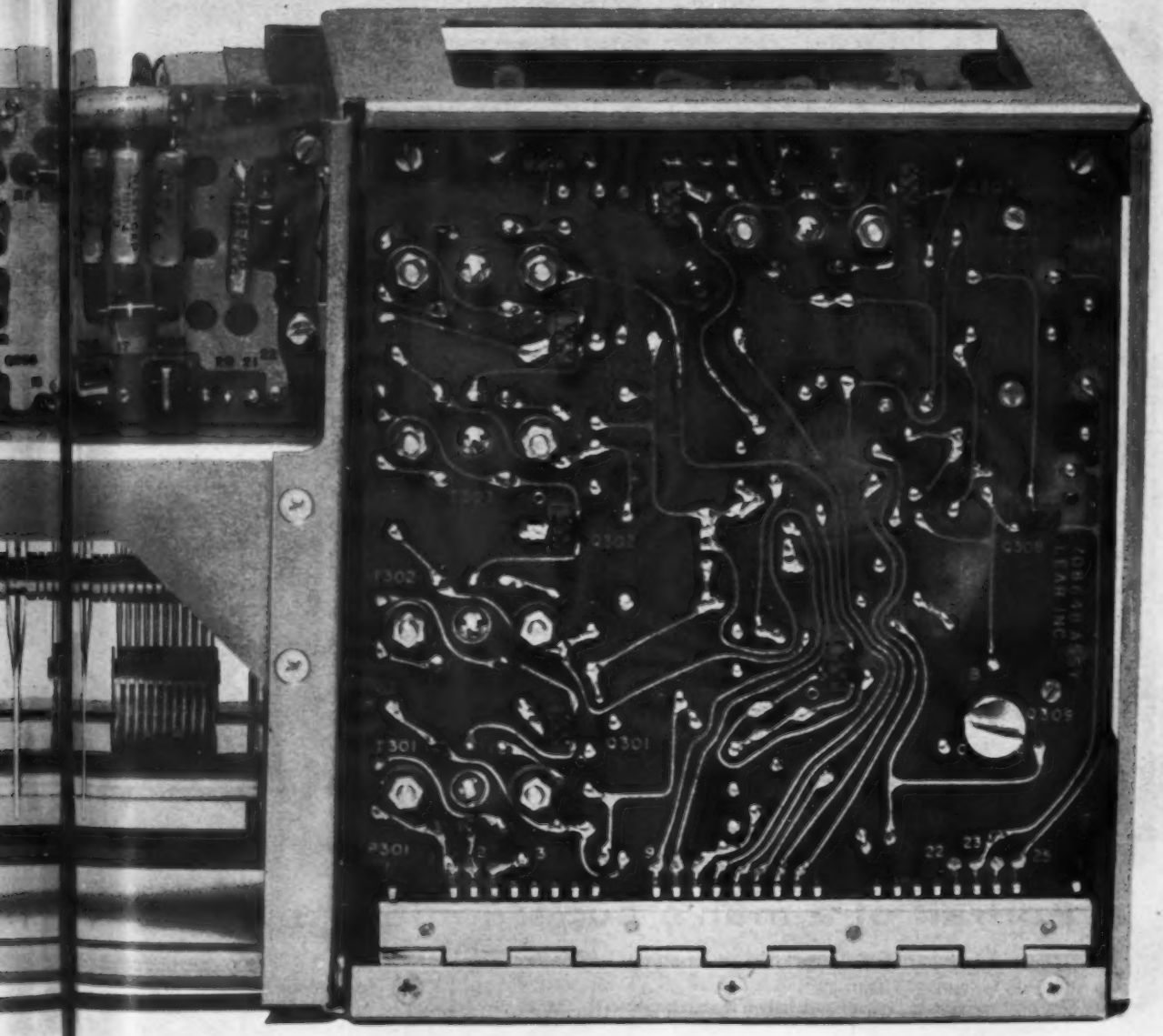

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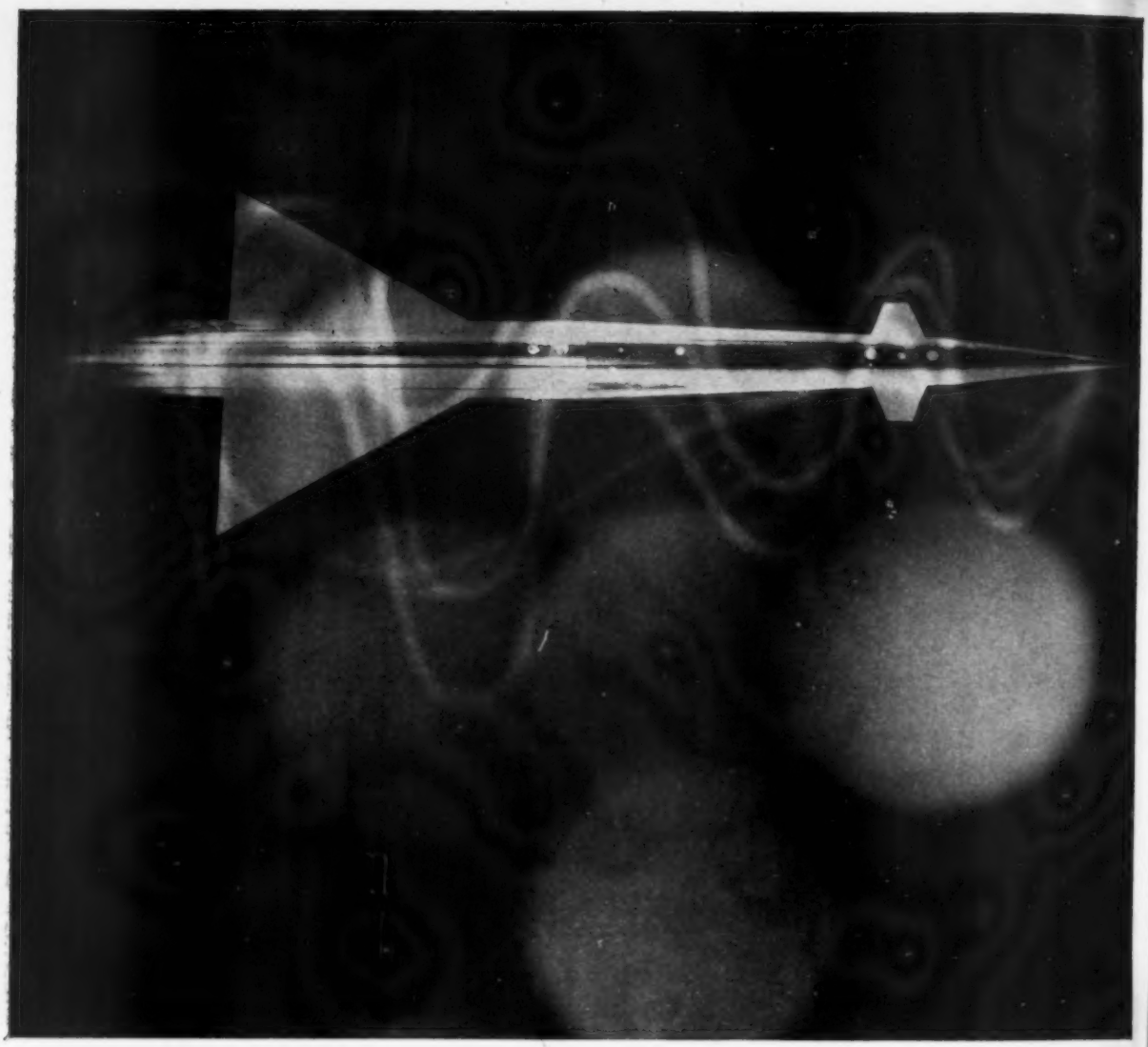
MOST COMPACT AND LIGHTEST WEIGHT of all airline calibre ADF's, the complete ADF-100 system weighs only 18.5 lbs. The receiver unit is ⅜ ATR rack (21 x 4¾ x 8⅜ inches).

CAA APPROVED FOR AIRLINE USE, of course, the ADF-100's new high levels of performance and dependability uniquely qualify it for the most demanding transport or executive plane applications.



Portrait of a man's supersonic alter ego

The speeds and altitudes achieved by today's aircraft have placed them beyond a human pilot's physical resources. They fly faster than he can think, decide and react...exert forces beyond his own strength or that of old-time hydraulic systems.

The answer: electro-mechanical colleagues with the superhuman reflexes, sensitivity and strength to cope with the phenomena of supersonic flight.

At AUTONETICS, *autopilots* are being produced that can take over a vehicle's controls and perform whatever maneuver the mission requires. These supersonic stand-ins are so swift, so sure, so sensitive they can feel out sudden changes in a plane's attitude and correct them before the pilot himself can sense them.

And they are fully integrated with *automatic landing systems* that groove supersonic craft like descending escalators as they approach and touch down at speeds so great they are a military secret. And they can do this at night, in rain or fog or snow.

These AUTONETICS systems—being used in both manned aircraft and missiles—are made possible by the imaginative marriage of engineering theory and practical design...supported by production tools and techniques as unique as the electro-mechanical nerves, muscles, brains and senses they produce.

AUTONETICS is a quality and quantity producer of flight control, auto-navigation, armament control, computer and other complete automatic control systems with significant implications for commerce and industry.

For more information—or for employment in this dynamic field—write: AUTONETICS, Dept. 1-AA, 12214 Lakewood Blvd., Downey, California.

Autonetics

A DIVISION OF NORTH AMERICAN AVIATION, INC.

AUTOMATIC CONTROLS MAN HAS NEVER BUILT BEFORE

(*Continued from page* 40)
available as a service to the industry early in 1956.

• **Based on a study** in which emphasis was put on avoiding emergency rather than coping with it, conclusions in the Bendix report stated: "An effective self-contained airborne collision avoidance system is now, and will continue to be, out of the question.

"Except for congested areas of limited size, a ground-based system is equally out of the question at present and may impose unacceptable rigidity on air traffic if employed in the future.

"The feasibility of a cooperative air-to-air system rests on the development of acceptable transmitter-receiver combinations capable simultaneously of observing relative position and of communicating cockpit data. The major difficulty appears to be in measuring azimuth."

Morrell feels the best available source of altitude and all rate data is the cockpit of the aircraft concerned. In a cooperative system both aircraft would carry transponding devices to telemeter data back and forth between the aircraft.

Such a system might give altitude and speed data, but Morrell believes relative position data might require radar range measurements by equipment in each aircraft.

Morrell's emphasis on "avoiding emergency" implies restrictions on freedom of movement and severity of maneuver. And if this is limited to 1g he does not hold out much hope for being able to get a sufficiently accurate measurement of relative position in time to achieve true collision "prevention."

The issues faced at the ATA meeting on collision equipment will not change. It is expected some other manufacturer will be found who will undertake early development of an interim system.

And it is expected the airlines will in most cases be willing to purchase and install such equipment even if high cost and weight penalties are involved.

Anything to help will be welcomed where installation is feasible. But the operators who expect to be using jets in the next few years will face some painful decision-making.

Any system proposed is likely to need a number of antennas. How to mount these without violating the ultra-critical structural and aerodynamic integrity of jetliners is the first question to be met. And then the prospect of different antennas for the later system must be faced.

• **Another snag** could develop in the type of radio transmission frequencies employed for interim and later systems. Originally the general plan was to use a band near 3,000 mc for both systems. This may change so that different frequencies are needed for both systems.

When this happens antennas must change and the frequencies be allocated by FCC in accordance with military and civil needs and available space in the crowded spectrum.

A hardly hoped-for answer would be to expect coordinated implementation of a cooperative system in all air carrier, military and private flyer aircraft. If such coordination were not carried out, even a very good system would have operational loop-holes.

• **Even if** cooperative devices in most aircraft were politically hopeful, equipment availability before 1961-1965 is considered remote.

About a dozen electronics firms are interested in a feasibility study based on limited operational information made available to date by the Air Force. One of the requirements is a system that handles closure rates of up to Mach 6 and all flight strata to 100,000 feet altitude.

Melpar, Inc. and Radio Corporation of America are reportedly among the firms most interested in studying development of a military cooperative system. ◈◈◈

Electronotes

• **U.S. Dept. of Commerce,** Office of Technical Services has published the technical papers presented at a 1953 Symposium on the Application of Transistors in Military Electronics Equipment. For background material on the state of art then, publication PB 111680 is available at $5.00 a copy.

• **Boeing Airplane Co.** has sold its analog computer business, started in 1949, to the Western Electronic Supply Co. Western has full rights to manufacture and sell the Boeing-developed computer.

• **General Precision Laboratory,** Pleasantville, N. Y., was awarded a $17-million contract by USAF's Air Materiel Command to manufacture AN/APN-81 and -89 Doppler radar navigation systems for aircraft.

Radar Beacon Receiver-Transmitters Aid in Guidance and Tracking of Missiles

Use of radar beacon receiver-transmitters in missiles is aiding guidance and tracking over greater distances than are possible with systems that depend upon normal radar echoes. Small areas on missiles for signal reflection often result in inadequate signal return. Artist's conception shows missile carrying AN/DPN-19 beacon produced by American Machine and Foundry Co.'s Electronics Division. Antenna is attached to missile tail fin.

Power supply and radar beacon of AN/DPN-19 system. Receiver picks up a single or double pulse-coded signal from ground radar and responds with a single pulse. Output signal can control auxiliary equipment in response to special interrogation. With self-contained battery, system can operate for 15 minutes.

Forward thinking TCA *selects Collins Automati*

COLLINS RADIO COMPANY, CEDAR RAPIDS, IOWA, WASHINGTON, NEW YORK, DALLAS, BURBANK, SEATTLE, MIA

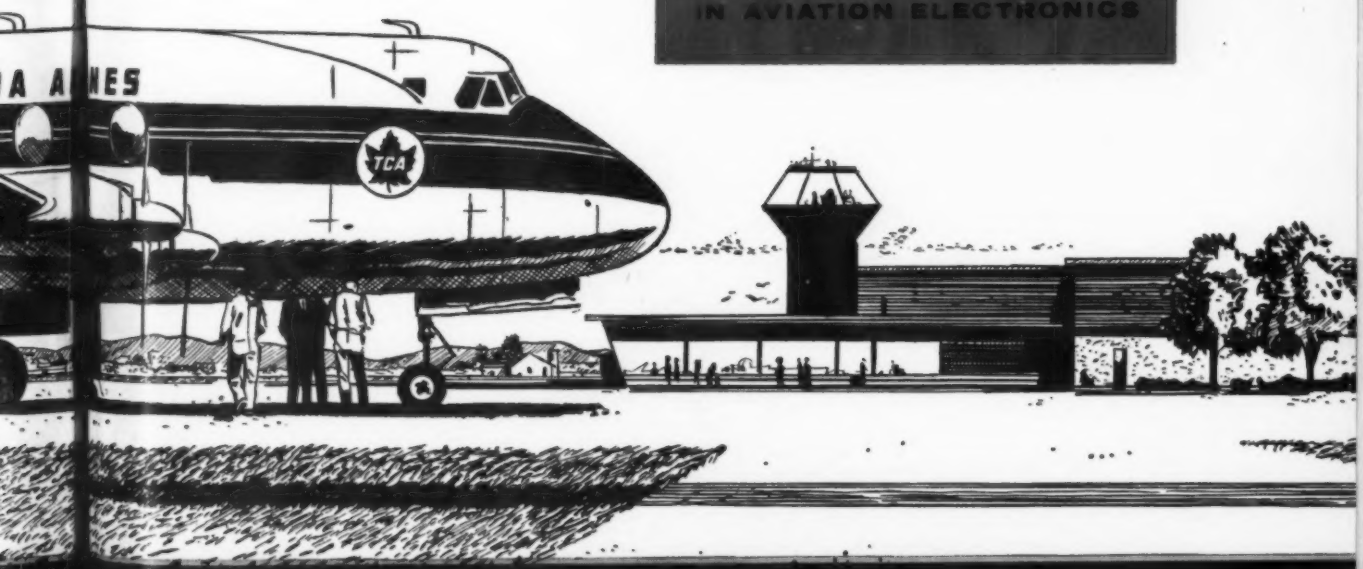
Installation of Collins Automatic Pilot System on Trans-Canada Air Lines' entire Viscount fleet has begun.

TCA chose the Collins System for its *compatibility*—combination of flight control with the original, time-proven "Integrated Flight System" provides monitoring by pictorial presentation on two easy-to-read instruments. *Smoothness*—designed for airline service, this System is refined with the latest techniques to assure smooth performance of maneuvers with positive control at all times. *Modularized*—packaged in modular plug-in type units for ease of maintenance.

Collins "combined" Automatic Pilot System is the natural choice of TCA.

Collins

CREATIVE LEADER IN AVIATION ELECTRONICS

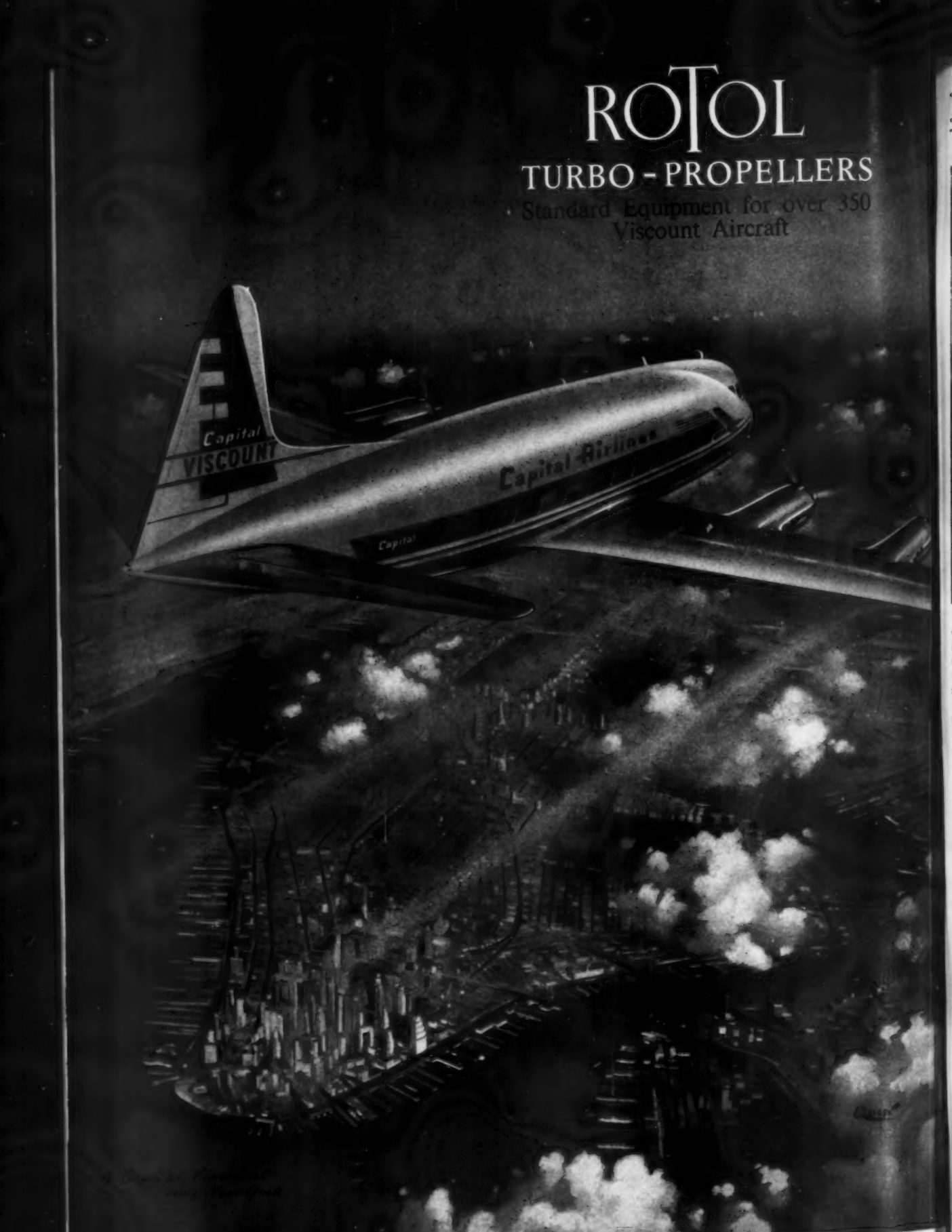


LE, MIA... RADIO COMPANY OF CANADA LTD., TORONTO: COLLINS RADIO COMPANY OF ENGLAND LTD., LONDON

ROTOL

TURBO-PROPELLERS

Standard Equipment for over 350
Viscount Aircraft



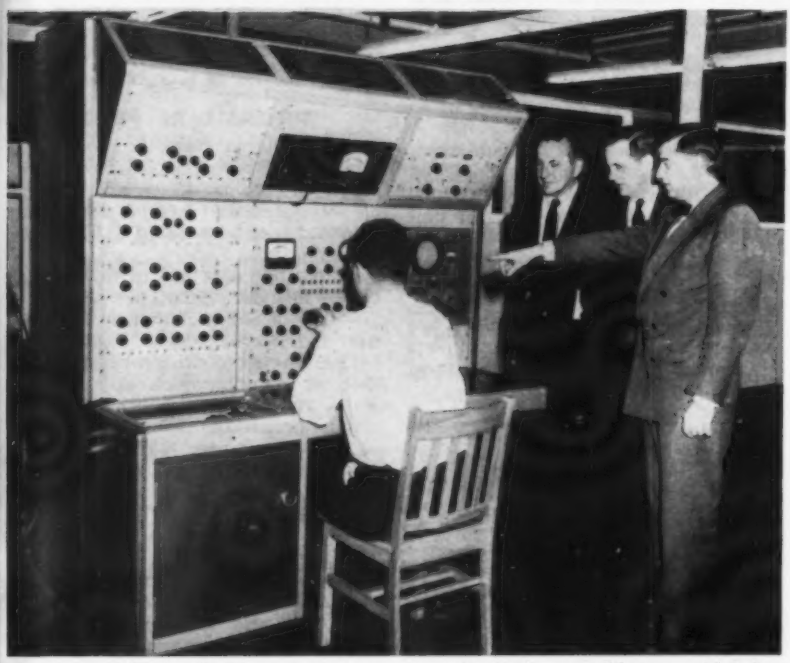
PUB/R/27/57

ROTOL LTD · GLOUCESTER · ENGLAND

630 Fifth Avenue New York 20

New Products and Processes

COMPLEX-MOTION TESTING CONSOLE



A complex-motion compensation console developed by **MB Manufacturing Co.,** a division of Trextron Inc., is designed for vibration research and development in guided missiles and supersonic aircraft.

The unit is part of a complex-motion testing system, which also includes an electronic amplifier, a high-frequency electrodynamic exciter and a control console.

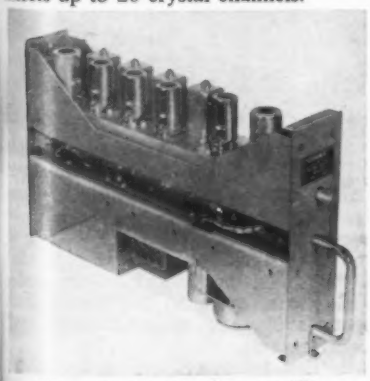
Company engineers believe the Model T67 constitutes an important advance in simulating airborne vibration environments and predicting the reliability of components.

Circle No. 107 on Reader Service Card.

GLIDE SLOPE RECEIVER

Dare, Inc. has developed an aircraft glide slope receiver with a transistor power supply in place of the usual dynamotor or vibrator. Weighing only 6¾ lbs., it fits the short ¼ ATR rack.

A Ledex rotary solenoid, controlled by an instrument panel switch, selects up to 20 crystal channels.



The power supply provides an electronic means of converting aircraft battery current into alternating current.

Designated Model DGS-20, the unit provides a highly selective circuit for use with as many as three indicators at a time. It is supplied with 10 crystals to cover all channels presently used in the 329.3-335 mc range.

Modular design simplifies servicing. All vacuum tubes are ruggedized.

Circle No. 126 on Reader Service Card.

FORCE GAUGES

A series of force gauges capable of holding the maximum reading after the load has been removed has been developed by **Hunter Spring Co.**

Series D-M instruments are modifications of earlier models. They are similar to gauges used to measure artificial-feel forces on aircraft controls.

Capacities are 50, 100, 150 and 200 lbs. Gauges are accurate to one dial division and measure force in either tension or compression.

Circle No. 117 on Reader Service Card.

GROUND SERVICE CARTS

Ground service carts developed by **Union Switch & Signal,** division of Westinghouse Air Brake Co., have been delivered to The Martin Co. for servicing the Martin B-57E twin jet tow target plane.

The carts are four-wheel trailers whose primary function is to service the B-57E by loading and/or unloading the target tow cable. Each cart carries five spools of 3/16" armored steel cable, 10,000 ft. long. It also carries 12 targets in storage tubes and miscellaneous equipment for servicing the aircraft.

Cable is loaded at about 1,000 ft. per min. A level-wind device, using the same principles as level-wind fishing reel mechanism, is said to assure level, tangle-proof loading or unloading.

Each cart has a combination drive motor and dynamic brake that can be connected to any of its five spools. Only one man is required to operate the equipment, along with automatic controls.

Circle No. 133 on Reader Service Card.

MHF TRANSMITTER-RECEIVER

A rugged medium-high frequency radio transmitter-receiver with a transistor power supply has been developed by **Transval.** It is designed for use in a wide range of aircraft, from airliners to light business planes.

Weighing less than 12 lbs., the entire unit is contained in a 1/2 ATR case. Trade-named the Transval Mark IV, it incorporates transistor circuitry that eliminates the need for a vibrator or dynamotor. The manufacturer says the unit weighs 15 lbs. less than the nearest comparable equipment.

A single electrical cable connects the radio to a small remote control head located anywhere in the cockpit.

Frequency range is from 2 mc to 10 mc. Transmitter power output is approximately 35 watts in quarter wave antenna. Receiver audio output is 10 watts. Receiver sensitivity is 6 db at 10 kc. Power consumption for the receiver is 1½ amps., the transmitter 7 amps. at 13.75 volts.

Circle No. 125 on Reader Service Card.

SAFETY HOODS

Two new safety hoods are being manufactured by the **Standard Safety Equipment Co.** One, a self-ventilating hood, is said to eliminate the need for airlines or self-contained air supplies where ambient air is safe to breathe. The other is a dust hood.

The self-ventilating hood is made of StaSafe Gra-Lite, a lightweight flexible material described as highly inert. Ratchet headgear is adjustable to any one of 32 head sizes.

The dust hood is inflated through an airline. It eliminates the need for a

headgear. Air supply provides air for breathing and inflates the hood. Relief valve, operating in one direction only, permits air to exhaust yet prevents contaminated air from entering.

Circle No. 132 on Reader Service Card.

MINIATURE SERVO PARTS

Reeves Instrument Corp., a subsidiary of Dynamics Corp. of America, has developed a new line of miniature servo mechanical parts designed for airborne 400-cycle servo systems.

These parts are said to be ideal for applications where low system inertias are required. They include miniature slotted mounting plates, hangers, dial assemblies, mechanical and electrical stop assemblies, couplings, differentials and a complete line of class II gears.

Parts are designed for use with ⅛" shafting. Gears are supplied in 64, 96 and 120 diametral pitches. A catalog is available.

Circle No. 112 on Reader Service Card.

ROTARY ACCELERATOR

A rotary accelerator for calibrating and testing small assemblies by subjecting them to known values of acceleration has been developed by **Schaevitz Machine Works.** It also calibrates accelerometers.

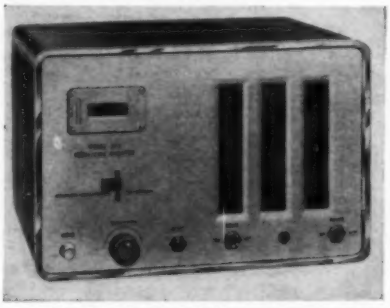
Designated Model C-1-A, the unit is capable of subjecting objects weighing 3 lbs. or less to accelerations up to 250 Gs.

For precise speed measurement, there is an auxiliary magnetic pickup for use with external frequency measuring equipment. Dimensions of the unit are 24" x 34" x 32¾".

Circle No. 108 on Reader Service Card.

TOTALIZING COUNTERS

Computer-Measurements Corp. has added a new series of totalizing counters to its line of electronic counting, timing and controlling instruments.



Model 300 totalizing counters automatically count any electrical, mechanical or optical event that can be converted into electrical impulses. Transducers to effect the conversion can be photocells, magnetic coils or switches.

Among the applications are measuring characteristics of engines, turbines and electric motors.

Specifications of the models range from 1 to 4 decades. Count capacities range from 999,999 for the Model 301A to 999,999,999 for the Model 304A. Counts per second range from 0-150 for the 301A and from 0-100,000 for the 304A. Pulse pair resolution is microseconds. Input requirements are 0.05 volt rms.

Circle No. 120 on Reader Service Card.

TUNEABLE RF PROBE

The Narda Corp. is producing a tuneable RF probe, Model 229, that includes an optional detector for use with all waveguide and coaxial slotted lines provided with a standard ¾" diameter mounting hole.

Insertion loss is said to be 25 db or less in most slotted lines.

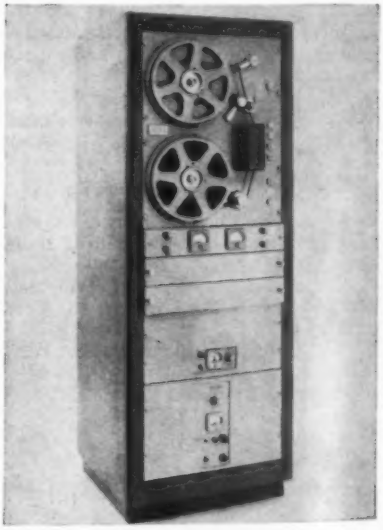
The probe pickup may be tuned over a range of 900 to 18,000 megacycles. There are two probe outputs. A detector output, which takes a BNC series connector, has provision for a standard microwave crystal, Series IN21 or IN23, or a Narda N-610B bolometer.

Because of its rf output, the Model 229 can be used with microwave receivers or other internal detectors.

Circle No. 127 on Reader Service Card.

TAPE RECORDERS

A new series of instrumentation tape recorders developed by **Ampex Corp.** incorporates modular electronic assemblies and tape-transport design improvements.



Series FR11000 makes it possible to record from one to seven tracks of data, which may be reproduced at four tape speeds. Direct recording may be used from 300 cycles to 100 kc. The dc to 10,000-cycle range may be recorded with fm methods. Pulse-width-modulated signals from 50 to 10,000 microseconds may be recorded within ±2 microseconds.

The transports are designed for either ¼"-or ½"-tape on 10½"-reels, with optional speed ranges of 7½, 15, 30 or 60" per sec. or 3¾, 7½, 15 and 30" per sec.

Circle No. 121 on Reader Service Card.

THE FIRST ANNUAL

NATIONAL AVIATION TRADE SHOW

ENDORSED BY NATIONAL AVIATION TRADES ASSOCIATION

A SUPERMARKET
TO SELL
AIRPLANES and ACCESSORIES
IN THE HEART OF

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Midway between

NEW YORK and PHILADELPHIA

At Spacious MONMOUTH COUNTY AIRPORT

Monmouth County, New Jersey (Via Garden State Parkway & N. J. Turnpike)

JUNE 1-9, 1957

For Exhibit Space Information and Complete Details, contact Jerry Gasqua, Managing Director, First Annual National Aviation Trade Show, Convention Hall, Asbury Park, N. J. Telephone PRospect 5-0900.

JET VANE GRINDER

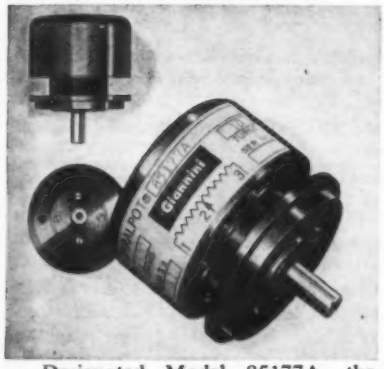
Ex-Cell-O Corp. has developed a jet vane grinder that automatically finishes curved surfaces of jet engine vane roots. It was designed for large aircraft engine builders.

Machine has four grinding wheels mounted on three spindles. Interchangeable trunnion fixtures are furnished to permit virtually continuous operation. While one fixture rotates the vanes through the grinding style, the second fixture is loaded by the operator.

Circle No. 115 on Reader Service Card.

HI-TEMP POTENTIOMETER

A high-temperature, "infinite-resolution" potentiometer has been introduced by **G. M. Giannini & Co.**



Designated Model 85177A, the unit is similar in design and appearance to other Spiralpot slide-wire type potentiometers made by this company. However, use of special materials and alloys in the winding drum and vital elements is said to allow a power rating of 1.5 watts at 150°C.

Available with linearities of 0.1% and 0.05% and standard resistance values of 50,100, 150, 200 and 250 ohms per turn in ten turn units.

Model 85177A is said to be suitable for high-resolution servo systems, computers or indicating systems.

Circle No. 124 on Reader Service Card.

PRINTED CIRCUIT SERVICE

Federal Telephone and Radio Co., a division of International Telephone and Telegraph Corp., offers a printed circuit and packaging service designed for solving complex problems in guided missiles, aircraft, electronic controls and aircraft communication equipment, as well as in other fields.

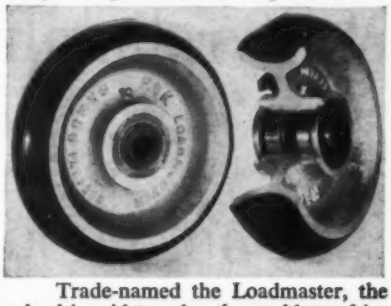
It is a complete service, from design to manufacture. Included among the facilities offered are equipment for rapid etching of copper laminates, a variety of plating equipment ranging from solder-coating to gold, equipment for processing printed-circuit resist patterns, facilities for automatic potting and encapsulation and protection of printed circuits by protective coatings.

Federal also offers a new type of 65-mil selenium rectifier that is said to offer major advantages over conventional equivalent rating designs.

Circle No. 111 on Reader Service Card.

ALUMINUM WHEEL

R & K Industrial Products has developed an aluminum industrial wheel for systems in continuous operation, incorporating a DuPont Neoprene tire.



Trade-named the Loadmaster, the wheel is said to solve the problem of increasing load capacity without sacrificing "rollability." The manufacturer says it resists the usual deterioration caused by animal fats, oils, greases, acids, brines, etc., as well as abrasion, cutting and chipping.

Circle No. 114 on Reader Service Card.

CLEANING SOLUTIONS

L & R Manufacturing Co. offers two new solutions, one for instrument cleaning and the other for rinsing.

These solutions were designed to remove oil, grease, dirt and foreign matter from delicate and intricate metal parts and components.

Trade-named L & R Nofome, the cleaning solution is an ammoniated soap with auxiliary solvents in an organic,

A little pull in the right place . . .

the ROBINSON wire twister

Aircrafts' Who's Who Reports

A cross section of the Who's Who in the aircraft industry—including Douglas, Allison, Fairchild, Grumman, Martin, Republic, Canadair Ltd., Pratt and Whitney among a host of others — is reported to have reduced engine wiring time as much as 66%. This saving is effected by the use of the new Robinson Wire Twister, an improved model of the ones that have seen service with the army, navy and airforce since 1943. Improvements include the exclusive diagonal jaw design that permits easier access to hard-to-reach areas, and clamps a vice like grip on the wire by pulling it into a 30° bend thus delivering added leverage for twisting.

In addition to the greatly increased engine wiring speed, users attest to improved shop safety — fewer skinned knuckles and bruised fingers.

Besides their production line assignments, Robinson Wire Twisters readily adapt in the shop to bench work, on radio and radar equipment, on magnetos, carburetors, instruments and sub-assembly work of all kinds.

List price is $19.50. Write for fully descriptive literature to Ralph C. Robinson Company, Dept. M, Box 3494, 2516 Crosby Way, North Sacramento 15, California.

Circle No. 12 on Reader Service Card.

. . . saves ⅔ the usual wiring costs

the ROBINSON wire twister

THIRD OF A SERIES

Why reliability engineering is not enough

There's more to reliability than meets the eye . . . a thousand inspectors cannot put reliability into an item that is inherently weak in engineering or production design . . . highest reliability in a component is obtained only when the manufacturer is aware of the problems in obtaining reliability . . . plus providing a proper climate in which employees are motivated by pride in product to surpass specifications.

In our humble opinion, the building of reliability into a product requires an alert *awareness* of the many, many facets of the problem. We'd like to submit these . . .

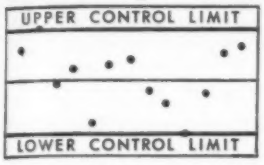
- ***"Integrity of intent" on the part of the manufacturer to meet the problems . . . coupled with provision of a proper climate for the carrying out of reliability objectives***
- ***Financial ability to take the necessary steps***
- ***Modern manufacturing equipment and methods***
- ***Plant capacity and flexibility***
- ***Design and engineering know-how that recognizes end-use requirements and environmental conditions***
- ***Careful employee selection and training***
- ***Long-range master planning***
- ***In-plant industrial and production engineering***
- ***Research, testing, development laboratory activities, including complete testing of prototype to end-use requirements***
- ***Continuous reliability assurance testing during the manufacturing operation, and institution of required corrective action***
- ***Collection, in the field, of failure data, analysis, and corrective action***
- ***All of these facets in depth***

Important as all of these are, the most important is the provision of proper climate, in the form of spirit and attitude of all personnel in pride of product, to carry out reliability objectives. In preceding articles in this series we've touched on some of the more technical aspects of reliability engineering. The manufacturer must naturally have an awareness of the problem, the integrity of intent to turn out the best product it can for a particular market or application, the financial ability to establish a Reliability program, the management ability to install it, the necessary manufacturing equipment and engineering organization to carry it out. But *all of these are not enough, if they are not instituted in a climate where an attitude will prevail that makes such things effective.*

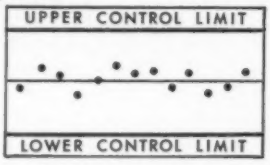
The manufacturer's integrity must necessarily be carried out, also, in the design, in manufacturing, and in finally warranting the product created . . . but, again, with every man and woman in the organization trying to meet or exceed the standards that have been created. This latter aspect we call "pride of product" on the part of the people who are producing it. And such pride must exist not only for the final product but for each part of that product, and in each step in the process. There is also an added dividend to reliability; the reputation of the product will cause the user to handle it with the same pride and care as was put into its manufacture.

It is interesting that people who are proud of a product, and enjoy what they are doing, can keep closer tolerances on the parts they work with and produce than those who are merely working for their pay. An assembler, who's proud of the product turned out, sees questionable components and avoids putting them into the assembly, while a disinterested person leaves them for "inspection" to catch. It is interesting in this connection, too, that some of the finest watch

parts made in Switzerland are produced in little shops where modern quality control techniques are unheard of . . . produced by a craftsman whose major technique is pride in his work . . . and thereby builds everything to the exacting tolerances required.



Quality control graph . . . without pride in product.



Quality control graph . . . with pride in product.

The atmosphere here at Cannon, since our inception in 1915, has included a design and manufacturing philosophy embracing the highest quality and reliability in each Cannon Plug for the specific application for which it is to be used. *To these principles all Cannon Plugs are built!* Even on connectors designed to customer or MIL-spec we constantly strive to give even more . . . to increase the safety factor . . . to give that "something extra" according to our own high "Cannon Standards", as exemplified in our Cannon Credo.

THE CANNON "CREDO"

TO DEVELOP *an organization of exceptional people possessed of respect for the dignity of the individual and imbued with the spirit of the team.*

TO PROVIDE *a facility with which we can produce to our utmost in an efficient and pleasant environment.*

TO DEVELOP *and produce products of such quality, and render such service, that we may always be proud of our efforts.*

TO MARKET *the product of our endeavor at a reasonable profit for continuing growth, reward for effort and a return on investment.*

TO ACCEPT *our responsibility to our community, our country, and our fellow man.*

The Cannon "Credo" is posted through all departments of all Cannon plants . . . Copy available to you on request.

On the more technical side . . . we at Cannon have attempted not only to provide the proper climate for a complete reliability program from the viewpoint of mental attitude, but to provide the necessary facilities in which that attitude may work effectively. One of the most important of such fields is that of engineering organization and proper utilization of specialized engineering personnel. As a purchaser of Cannon Plugs, with a personal stake in their reliability, you will be interested to know that our engineering divisions are grouped as follows:

Master Planning Group . . . men who look to the future . . . investigating the newest in technological improvements, providing interplant project coordination for maximum flexibility to meet the challenges of our ever-changing future.

Industrial Engineering Group . . . experts who call out the materials, methods, and processes to be used in the manufacturing cycle . . . experts who collect, analyze, and institute corrective action in accordance with field failure data.

Sales Engineers . . . fully qualified technical men who contact our customers.

Design Engineers . . . specialists in past and present design methods who analyze failure data caused by design inadequacies and initiate corrective action.

Development Engineering and Model Shop Group . . . specializing in the development of prototypes. In these Laboratories, your prototype is tested to see that all specifications are met . . . physical, operating, environmental. Test reports are made up, and presented to you for review and approval. Not until all these steps have been taken is your order placed in production.

Product Engineers . . . specialists in particular types of connectors.

Quality Control Group . . . well qualified to administer the high requirements of "Cannon Standards" . . . staffed by well trained inspectors and analysts equipped with the most modern equipment.

Quality Engineering Group . . . handling the technical aspects of sampling plans . . . preparing inspection and test procedures to realize the customer's desired quality level and the over-all quality level of the entire Cannon manufacturing operation. Materials are processed through receiving inspection. Process, re-work and final inspection barriers are set up. In addition to standard Military and Cannon manuals of quality control procedures, specific jobs . . . such as yours . . . may require additional special inspection or testing. If so, these requirements are established throughout the process, and where necessary, coordinated with you. Our failure data collection and analysis in this field has given us intimate knowledge of the critical points at which such control should be used. Recognized statistical control procedures are used both in process and at the inspection points.

Materials and Processes Laboratory Group . . . working in both the research and production phases. This is the group that checks performance of new designs, constantly investigates new materials and processes, and (over and above normal manufacturing supervision and quality control operation) runs continuous reliability and assurance tests on the manufacturing cycle.

* * *

Each of our 20,000 Standard Cannon Plugs are of highest quality and were designed to meet exacting reliability requirements. We also produce special designs to meet the most exceptional AQL end-use requirements.

If you have a problem requiring high-reliability Cannon Plugs, we would appreciate the opportunity working with you.

Cordially,

Robert J. Cannon *President*

CANNON ELECTRIC COMPANY
3208 Humboldt Street, Los Angeles 31, California

Please Refer to Dept. 404

CANNON PLUGS

Eight plants around the seven seas!

Circle No. 13 on Reader Service Card.

water-free solvent base. Its flash point is approximately 100°F, TCC.

The rinsing solution, a compound of highly refined petroleum-base solvents, is designed to dissolve the cleaning solution from the parts being cleaned.

Circle No. 113 on Reader Service Card.

AUTOMATIC DIRECTION FINDER

LearCal Division of **Lear Inc.** has announced the 1957 version of its lightweight automatic direction finder for business planes, Model ADF-12E.

This unit is a combined automatic direction finder, a broadcast receiver and a radio range and communications receiver. It can be continuously tuned through three bands: 190-440 kc, 420-900 kc and 850-1,750 kc.

The tuner, which mounts on the instrument panel, features a new illuminated dial.

Weight of the complete system, including tuner, amplifier, electric-driven loop and indicator, is less than 18 lbs.

Circle No. 128 on Reader Service Card.

GAUGE SAVER

An in-line gauge saver developed by **Fisher Controls Inc.,** designed for hydraulic fuel or pneumatic systems, is said to provide positive, automatic protection against gauge overload.

Shut-off point is controlled by a compression spring that may be adjusted to accommodate minor changes. Standard units with ¼" male tube or ¼" female pipe outlet connection are available from stock in shut-off pressures from 60 to 3,000 psi.

Weight, approximately 2 oz.; length, 3". Operating temperature range is from —65° to 160°F. Maximum operating pressure, 5,000 psi.

Circle No. 105 on Reader Service Card.

CHILLING MACHINE

Cincinnati Sub-Zero Products offers a chilling chamber for use in impact-testing of metals.

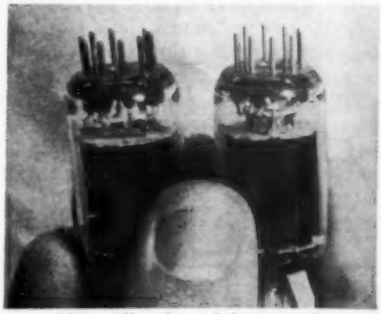
Designated Model LA-120-2, the machine permits accurate control of temperatures from 25°F to —135°F for a wide range of experimentation. It is of "low-boy" design, since metal specimens must be removed in three seconds or less and placed in the nearby anvil of the testing machine.

Chilling chamber has a capacity of 2 cu. ft. Outside dimensions of the unit are 24" x 40" x 32".

Circle No. 109 on Reader Service Card.

SCOURING PROCESS

A scouring process designed to assure good tube pin-to-socket contact in equipment using high-reliability miniatures has been developed by **General Electric.**



Normally, in miniature tube production, an oxidation residue is formed on the nickel pins as a result of the 1,000°C heat of the button stem sealing process. Now the residue is cleaned from GE Five-Star tubes with an abrasive emulsion.

Once removed, the oxide coating will not reform in normal tube use.

Circle No. 122 on Reader Service Card.

PNEUMATIC SAFETY CUSHION

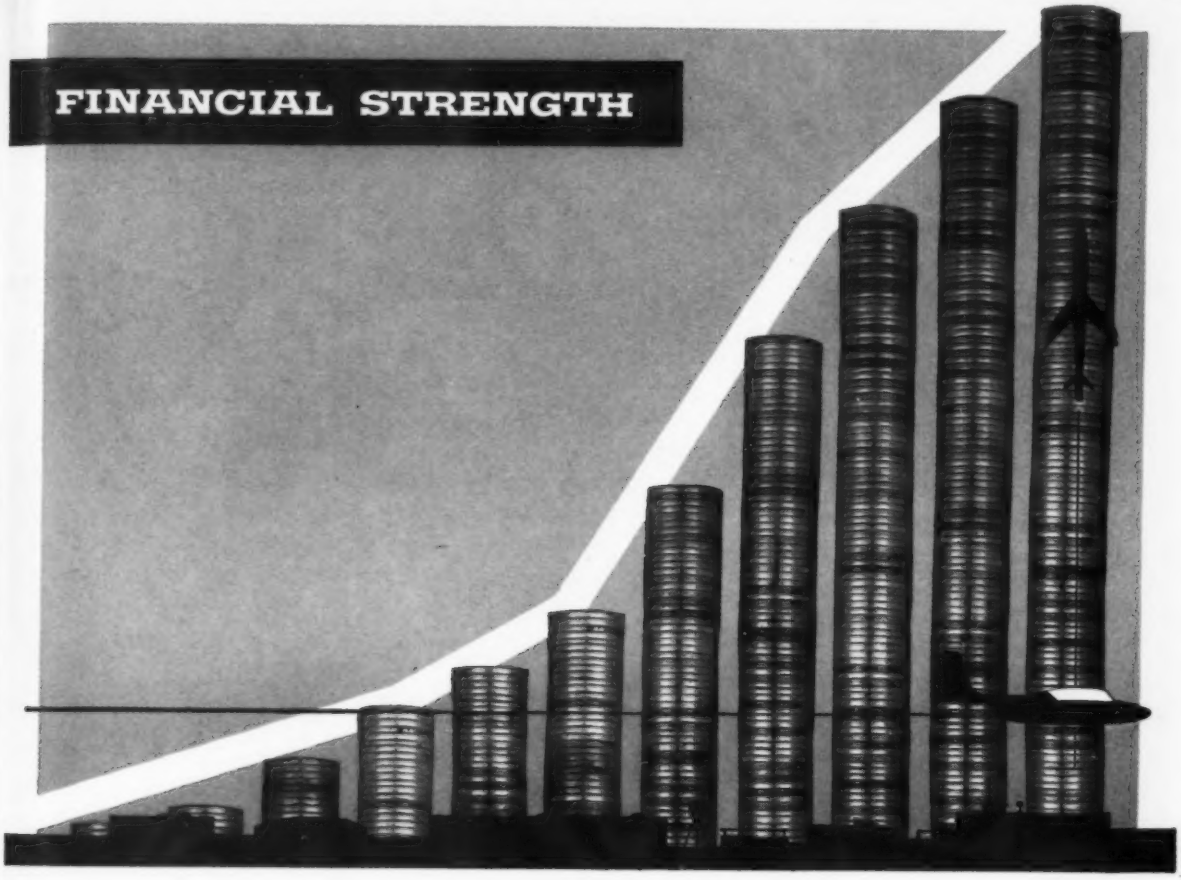
A pneumatic safety cushion that is expected to reduce injuries to passengers in accidents or forced landings has been designed by Assen Jordanoff, veteran flyer, aeronautical engineer and writer. It is scheduled to be produced by **Micro-Moisture Controls, Inc.** within the next few months.

Called a crash pillow, the cushion is simply an L-shaped rubberized nylon bag weighing less than 2 lbs. It is stowed while deflated in the back of airplane seats. The pilot, by pressing a single button, can release and inflate every cushion in three seconds.

The designer says the cushion has been successfully demonstrated and is being studied by the Defense Dept.

Circle No. 134 on Reader Service Card.

IN ENGINEERING THE BEST OPPORTUNITIES ARE IN AVIATION • IN AVIATION THE BEST OPPORTUNITIES ARE AT TEMCO



At Temco GROWTH tells the story

Growth — in financial strength, for example, tells the Temco success story.

At the end of its first full year of operation, 1946, Temco's net worth was $23,042. Within five years, this figure was multiplied one hundredfold; and in 1955 — the company's 10th anniversary — its net worth had zoomed to $10,402,937. This year, as a result of steadily expanding facilities and new prime contracts climaxing the successful development of aircraft, missiles and weapons systems of its own design, Temco's financial stfength will set an impressive new record.

For the engineer who sets his sights high, Temco's increasing financial strength means the prestige of a soundly established company, plus the opportunity that only a vigorous, growing organization can offer. Here's your opportunity to match your stride to a company that's going places — fast!

Mr. Joe Russell, Engineering Personnel
Room 10-E, Temco Aircraft Corp., Dallas, Texas

Please send me complete details of the Temco story of unusual opportunities for creative engineers. I am especially interested in _____

NAME _____

ADDRESS _____

CITY _____ STATE _____

AIRCRAFT CORPORATION • DALLAS

IN ENGINEERING THE BEST OPPORTUNITIES ARE IN AVIATION • IN AVIATION THE BEST OPPORTUNITIES ARE AT TEMCO

ROUND THE CLOCK...
THROUGHOUT THE YEAR

THERE'S *ACTION* AT LOCKHEED IN GEORGIA

Action! Progress! Exciting new projects such as our multimillion dollar nuclear facility and new Engineering Center. These make up the strong tide of vigorous living at work and play here in the engineering, science, and aircraft manufacturing center of the South.

Here is a place to dig in where there's still career room!

Qualified Engineers and Scientists interested in becoming associated with this progressive organization are invited to inquire for further information or personal interview.

LOCKHEED AIRCRAFT CORPORATION, Dept. 128-AMA
761 Peachtree Street, N.E., Atlanta, Georgia

Write for interesting brochure on engineering opportunities.

By Anthony Vandyk

Lufthansa has come up with a couple of rarities for an airline. It produced its traffic figures for 1956 four days after that year ended. And it has praised the equipment that it operates. The German airline has issued statements about the performance of its L-1049G Super Constellations and Convair 340 fleets that should gladden the hearts of Lockheed and General Dynamics.

Discussing the Super Connies, Lufthansa says that both the range and the speed of the aircraft have proved "highly satisfactory." For the period through August 1956 they were able to overfly Gander on 95.5% of the 561 eastbound schedules operated by the airline. Westbound, 57% of the 553 flights were able to fly non-stop from Shannon or Paris to New York. In two instances there were non-stop flights from Germany to the U.S.

• **The Super Connies** have established various records for Lufthansa, including 10 hrs. 35 min. for New York-Frankfurt. The daily utilization of Lufthansa's eight Super Constellations continues to rise and last summer reached the 9½-hr. mark.

Reliability has been the keynote of Lufthansa's Convair 340 operations, the airline says. Only two P&W R-3800 engines had to be pulled before reaching their scheduled overhaul life.

Lufthansa has four 340s and has two 440s on order. Through August the four aircraft had logged 15,300 hours and had made 11,550 take-offs. In the same period the Super Connies logged 23,000 hrs. including 7,100 take-offs. The German airline's three DC-3s flew 6,500 hrs. including 6,100 take-offs. Much of the DC-3 flying was for training.

• **The most urgent** and important single task facing Lufthansa, in its opinion, is the training of flight personnel. The company is trying to persuade the German federal and state governments to contribute financially to its flight training school at Bremen but so far without success.

At the moment all European services are being flown with German crews but on the North Atlantic U.S. and British captains continue to be in command of most of the Super Connies. Only five Germans have qualified as Super Connie captains to date. Lufthansa now has a total of 21 qualified captains and 95 co-pilots of German nationality. The airline estimates that by mid-1958 it will need about 200 pilots.

Because training is so important at the present stage of Lufthansa's development, the airline currently has just about as many trainers as it has commercial transports. The Bremen school now operates no less than 12 aircraft—eight de Havilland Chipmunks, two Saab Safirs and two Beechcraft Twin Bonanzas.

International Aircraft Leasing Firm Wins Backing of American Capital

An important newcomer to the international aviation scene is the International Aircraft Leasing Company Inc. (IALCO). The firm has ordered three DC-7Cs from Douglas Aircraft Co. and has arranged to lease them to SABENA Belgian World Airlines.

The aircraft have been purchased by IALCO-BEL Inc. of Wilmington, Del., an affiliate of IALCO. Per A. Norlin, an executive and past president of Scandinavian Airlines System, is chairman of both IALCO and IALCO-BEL.

U.S. capital predominates in IALCO but Swedish and Swiss investors are also represented. John S. Russell, Jr., a member of Hale, Stimson, Russell & Nickerson, attorneys for IALCO, is president of the new leasing company. The board of directors of IALCO-BEL also includes representatives of Dillon, Read & Co. and the participating investors.

• **Finance** for the purchase of the three DC-7Cs, involving $7,200,000, was arranged by Dillon, Read & Co., Inc. and, according to IALCO, "is based on a plan especially developed to provide a means whereby American capital can be utilized in financing the aircraft equipment needs of international airlines."

SABENA is the first carrier to sign a contract with IALCO but several other leading European airlines are negotiating for leases. Norlin believes that the IALCO plan will assume increasing importance as airlines move forward with their jet re-equipment programs.

Discussing his company's program to lease the three DC-7Cs, Gilbert Perier, chairman of SABENA, said the plan would permit the airline to obtain the use of additional aircraft at a reasonable cost during a period when the company is faced with substantial capital outlays for other aircraft it has on order. These include other DC-7Cs, Boeing 707s, Convair 440 Metropolitans and Sikorsky helicopters.

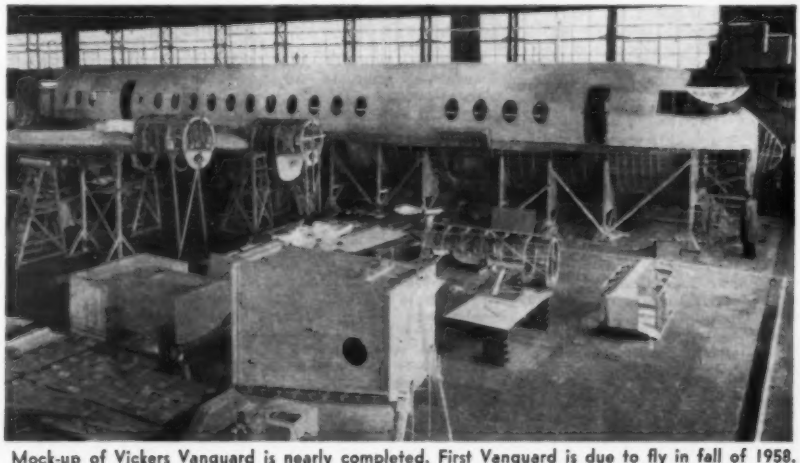
MANUFACTURING BRIEFS

Finland's **Valmet** company will build the Folland Gnat lightweight fighter under license. The Finnish Air Force is also buying 12 British-built Gnats . . . **Vickers-Armstrongs (Aircraft)** plans to be building four Vanguards a month by November 1960. . . **English Electric** has built more than 500 Canberra jet bombers. . . **Dassault's** first assembly-line Super Mystere B2 fighter will be produced by the end of the month. Output is scheduled to be 15 aircraft a month. . . **Sud-Est Aviation** is building 13 turbine-powered Alouette helicopters monthly. The French government had accepted 32 as of December 31.

AIRLINE BRIEFS

Two Japanese airlines, **Japan Helicopter Transport** (Nipperi Air Lines) and **Kyokuto Koku** (Far Eastern Airlines), has made preliminary arrangements to merge . . . **Linea Aerea Nacional,** Chilean flag airline, plans to start service from Santiago across the Pacific to Australia via Easter Island. A 10,000-ft. runway on Easter Island is due to be completed next year. . . **Air Austria,** the paper Austrian airline, no longer has the backing of KLM. **SAS** continues to hold an interest in the other embryo carrier, Austrian Airways. . . **Turkish Airlines** and Chicago Helicopter Airways have joined IATA.

British Honduras Airways is the new name of British Colonial Airlines following the latter's acquisition by British West Indian Airways. It operates four Cessnas in British Honduras . . . **Pacific Western Airlines** has applied to the Canadian Air Transport Board to operate a route from Vancouver to Grand Cayman, British West Indies.



Mock-up of Vickers Vanguard is nearly completed. First Vanguard is due to fly in fall of 1958. Delivery of British European Airways' 20 aircraft will start in spring of 1960. TCA will get first of its 20 Vanguards in fall of 1960.

People

HOLSCHUH

FRISCHE

LEE JOHNSON

STARNER

LANAHAN

A. W. JOHNSON

MANUFACTURING

Name	New Position	Former Position
Carl G. Holschuh	Pres. and gen. mgr., Sperry Gyroscope Div., Sperry Rand Corp.	Exec. vp and gen. mgr.
Dr. Carl A. Frische	Executive vp, Sperry Gyroscope Div.	VP-operations
Charles M. Green	Retired	Pres., Sperry Gyroscope Div., Sperry Rand Corp.
Joe Daniels	Dir. sales, Zero Mfg.	Chief sales engnr., industrial div., The Bircher Corp.
Warren F. Bice	Gen. mgr., The Progressive Mfg. Co. Div. of The Torrington Co.	Gen. sales mgr.
James G. Weldon	Hydraulic sales mgr., Pacific div. Bendix Aviation Corp.	Asst. mgr. of hydraulic sales
Robert Storrs	Asst. sales mgr., Chandler-Evans	Pratt & Whitney Aircraft sales supervisor
Fred B. Ortman	Asso. dir., Stanford Research Institute	Recently retired Bd. Chmn., Gladding, McBean and Co.
Paul L. Layton	Nat'l aircraft engrg. representative, Textile Products Div. of Owens-Corning Fiberglas	Los Angeles branch mgr.
Sidney R. Curtis	Sr. VP of Stromberg-Carlson, a div. of General Dynamics Corp.	VP-govt. contracts and head of electronics div.
George A. Peck	VP and gen. mgr.-electronics div., Stromberg-Carlson, a div. of General Dynamics Corp.	VP-manufacturing
Steven E. Puffer	Dir. procurement, Minneapolis-Honeywell Regulator Co.'s aeronautical div.	Asst. dir. of procurement
Donald Starner	Mgr. of sales and gen. accounting, B. F. Goodrich Aviation Products, a div. of The B. F. Goodrich Co.	Gen. accountant in field accounting
Paul V. Galvin	Bd. chrm., Motorola, Inc.	President
Robert W. Galvin	President, Motorola, Inc.	Exec. vp
Daniel E. Noble	Exec. vp, Motorola, Inc.	Vice president
Arthur L. Reese	VP and gen. mgr., new communications and industrial electronics div., Motorola, Inc.	Gen. mgr., industrial electronics and communications products dept.
Lee S. Johnson	Gen. mgr. Sikorsky Aircraft div., United Aircraft Corp.	Sr. asst. gen. mgr.
Dr. Clarence Zener	Dir., Westinghouse Research Laboratories, Westinghouse Electric Corp.	Acting director
Gerald E. Schmitt	Mgr. field engrg., Brubaker Electronics	West coast dist. sales mgr., Airborne Accessories Corp.
James D. McLean	Pres. and gen. mgr., Hoffman Laboratories, Inc., Hoffman Electronics Corp.	VP and gen. mgr., govt. and industrial div., Philco Corp.
David F. McCallister	Chief engrg. flight test sect., All American Engineering Co.	Jet pilot, USAF
Joseph M. Gentile	Exec. vp, Resistoflex Corp.	Treas. and vp-mfg.
Walter W. Varner	Head, flight simulation laboratory and computers, astronautics div., Convair	Head, computation laboratory, applied mathematics dept., Univ. of Colo.
Allen Meyer	Military export sales mgr., Lockheed Aircraft Corp.	Sect. supervisor, military sales
Louis Polk	VP. dir., group exec., Bendix Aviation Corp.	Bd. chmn. and pres., Sheffield Corp., Dayton, Ohio
Morris Piotkin	Asst. dir., facilities planning, Northrop Aircraft	Dir. oper. research, Slick Airways
Carl J. (Red) Hansen	Retired	Chief engnr., Los Angeles div., North American Aviation
M. W. Nesbitt	Dir. engrg., Pesco products div., Borg-Warner Corp.	Staff asst. to pres., and research dir.
John A. Lauck	Resigned	Dir. engrg., Pesco products div., Borg-Warner.
H. Edward White	Dir. personnel, Autonetics div., North American Aviation	Dir. industrial security, missile devel. div.
John W. Dale	Dir. industrial security, missile devel. div., North American Aviation	Industrial security representative, Patrick AFB.
Laurance H. Cooper	Mgr. military products, American Bosch Arma's Los Angeles office	Pres., Hall-Scott Motors
Lewis F. Millett	Head, radar devel. dept., research laboratories div., Bendix Aviation Corp.	Research and devel. staff
A. Roger Conant	Flight oper. mgr. and chief test pilot, El Segundo div., Douglas Aircraft Co.	Test pilot
La Verne W. Brown	Retired	Flight oper. mgr. and chief test pilot, El Segundo div., Douglas Aircraft Co.
Maj. Gen. Francis H. Lanahan (USA, ret.)	President, Federal Elec. Corp. of Lodi, N. J.	Exec. vp.

AIRLINES

Gen. Aldo Urbani	Pres. LAI-Italian Airlines	Chief of Staff, Italian Air Force
R. Vernon Radcliffe	Dir. economic research, Trans World Airlines	Asso. dir., CAB's Air Operations Bur.
Cyrus S. Collins	VP-sales and traffic, Panagra (Pan American-Grace Airways)	Asst. vp.
Larry Decker	Asst. to the vp-traffic and sales, Bonanza Air Lines	Regional sales mgr. of Nevada
Eugene C. Taylor	VP-oper., maintenance and engrg., American Airlines' Tulsa overhaul base	Asst. regional operations officer at Ft. Worth
Jack K. Barker	Pub. rel. mgr.-southern region, National Airlines, Inc.	Pub. rel. dept.
John H. Mahoney	Dir. traffic, American Airlines	Asst. dir., tariffs and schedules
Alwin W. Johnson	VP and dir. of finance, Slick Airways	VP, treas., and dir., Southwest Airways
Joe P. Martena	Supt. of maintenance, Continental Air Lines' engine overhaul base being built at Los Angeles	Supt. of inspection
A. B. (Gus) Armes	Supv. cabin services, passenger service dept., Delta Air Lines	Analyst, methods and training dept.

How Holley's Compressor Governors Help New Jets to Supersonic Speeds

"City-savers" Air Force men call them: the J-57-powered F-100, F-101, F-102 and Navy F8U, with level flight speeds faster than sound. And city-savers they could well be. Certainly their rapid approach to the fringe of Mach 2 heralds a new era in the progress of jet flight.

Sharing in the development of this new brood of supersonic fighters, Holley engineers, working closely with Pratt & Whitney Aircraft on the J-57 engine, designed the compressor bleed governor.

This new Holley compressor bleed governor is one more example of Holley's continuing leadership in the design, development and manufacture of superior engine control systems for both military and civilian use.

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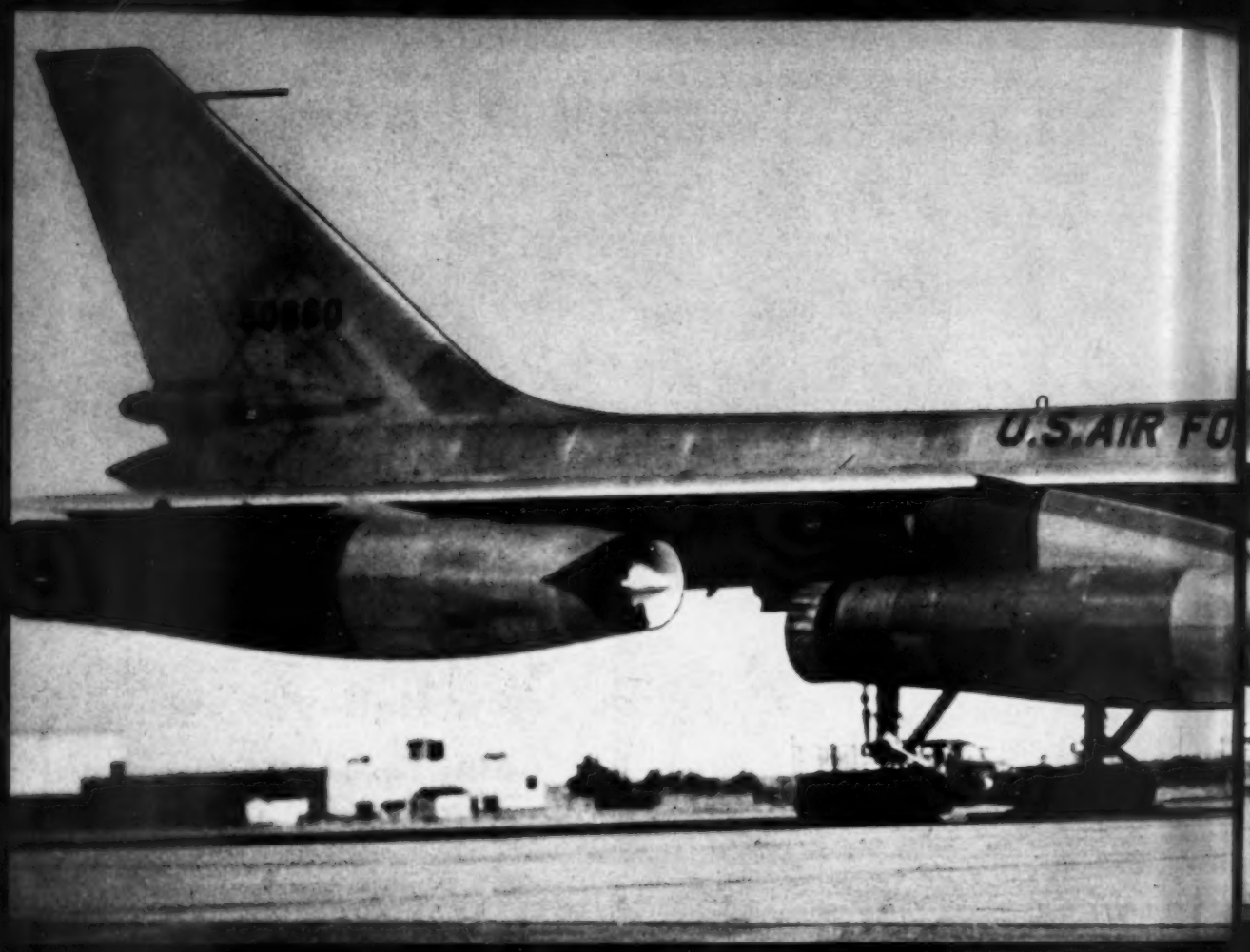
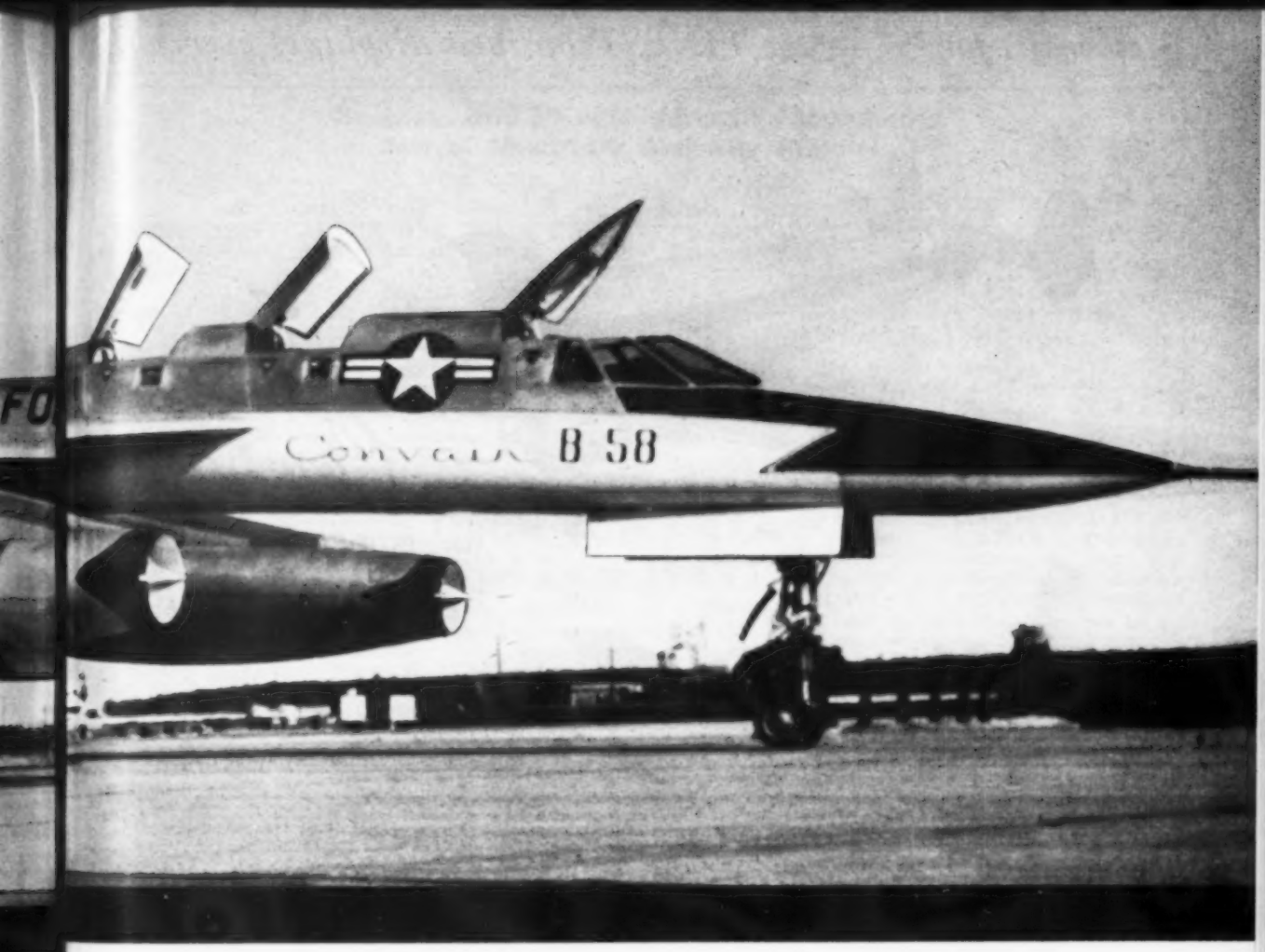


Early flight-test results on . . .

AMERICA'S FIRST SUPERSONIC BOMBER— POWERED BY GENERAL ELECTRIC J79

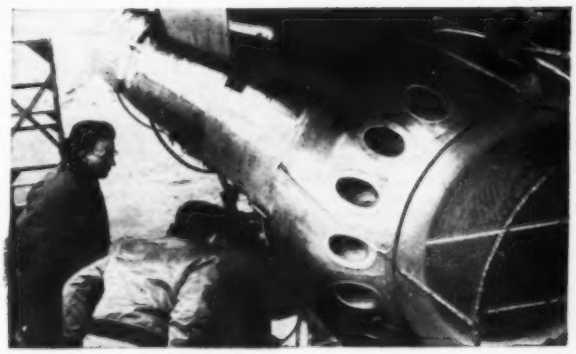


Fort Worth, Jan. 4—Convair reports that no test flight of the four-jet B-58 bomber has been aborted due to engine discrepancies since commencing flight testing on November 11. This has broken all records for any such aircraft development program.

Spectacular in appearance and performance, Convair's new B-58 Hustler combines a unique weapons-carrying airframe with four powerful new General Electric J79 turbojets.

Advanced design of the J79 is a prime factor in the Hustler's flight capability. Smaller and lighter than the famous G-E J47, the J79 today delivers more power per pound than any other turbojet of comparable size. The J79's small frontal area contributes greatly to the low-drag characteristics of the delta-winged bomber.

Dramatic example of U.S. jet progress, the G.E. powered Convair B-58 promises to be the most potent weapons system yet added to bomber squadrons of the U.S. Air Force. *General Electric Company, Cincinnati 15, Ohio.* 235-14



SMALLER, LIGHTER, MUCH MORE POWERFUL than any previous G-E engine, General Electric's new J79 first went aloft in North American B-45 "flying test bed" (above) in May, 1955. Engine is now in production for both the B-58 and the Lockheed F-104A.

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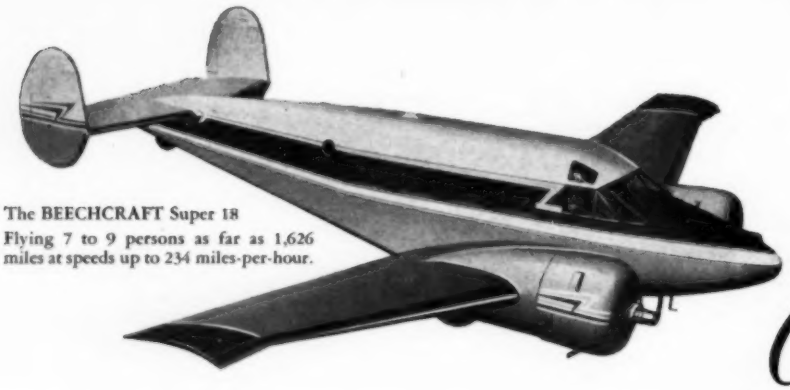

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Business and Private Aircraft Movements
Port of New York Authority Airports

	1949	1950	1951	1952	1953	1954	1955	Jan.-Sept. 1955	Jan.-Sept. 1956	% Change Jan.-Sept. 1956 over Jan.-Sept. 1955
LaGuardia	12,951 (159,465)	13,475 (156,470)	17,779 (183,243)	19,705 (185,622)	23,239 (199,407)	28,334 (203,572)	35,049 (223,005)	26,035 (168,050)	27,917 (171,496)	+7.2
Teterboro	N.A. (212,149)	N.A. (183,841)	41,622 (199,759)	48,514 (198,402)	60,412 (202,841)	80,012 (209,494)	74,270 (219,651)	57,681 (166,700)	62,915 (173,729)	+9.1
Newark	7,842 (93,463)	8,412 (89,171)	9,670 (100,177)	3,676 (27,164)	9,756 (80,429)	10,724 (95,331)	12,961 (105,644)	9,615 (79,118)	11,013 (89,600)	+14.5
NYIA	1,600 (18,115)	1,971 (19,275)	3,180 (34,413)	4,245 (105,205)	4,150 (87,885)	5,652 (100,976)	6,784 (123,439)	5,204 (90,489)	5,747 (111,566)	+10.4
Totals	22,393 (483,192)	23,858 (448,757)	72,251 (517,592)	76,140 (516,393)	97,557 (570,567)	124,722 (609,373)	129,064 (671,739)	98,535 (504,357)	107,592 (546,391)	+9.2

Figures in parentheses are total movements for period indicated.
NYIA—New York International Airport (Idlewild).
N.A.—Figures not available.

Business, Private Traffic at 4 PNYA Airports Up Fivefold Since 1949

Business and private aircraft movements at Port of New York Authority's four airports have increased more than fivefold since 1949—from 22,393 to 129,064 last year.

PNYA reports that during the first nine months of 1956, there was an increase of 9.2% over the same period a year ago to 107,592 movements, which accounted for almost a fifth of all plane movements at the four airports—LaGuardia, International, Newark and Teterboro.

During the past eight years, LaGuardia has shown an annual increase in non-commercial traffic, while International showed a decrease in 1953 and Newark in 1952. However, Newark last year registered an increase in transient traffic of 14.5% over 1955—greater than increases at any of the other three PNYA airports.

Teterboro, at Hasbrouck Heights, N.J., ninth busiest airport in the country, estimates that between 40 and 50% of its landings and takeoffs are by business aircraft. Business flying figures in the accompanying table do not include movements of flying school aircraft, but overall totals (in parentheses) do.

As an indication of the growth of business and private flying at major airport terminals, Butler Aviation at LaGuardia, fixed base operator that services these aircraft, reports its monthly gasoline sales have increased six times in four years—from 30,000 to 170,000 gallons.

York, Pa. Fights Plan For Nearby Airport

A legal battle over location has put a crimp in the plans of the York, Pa., Port Authority and the Pennsylvania Air National Guard for a new airport at Admire, Pa., just outside York.

Oscar L. Hostetter, owner and operator of York Airport, seeks to stop development of the Admire site, which he says is only 1¾ miles from the end of his main runway.

In his petition for a permanent injunction, Hostetter charges that the proposed field would duplicate existing and adequate facilities, which he says is against Pennsylvania law and contrary to the provisions of the federal aid to airports program. He also charges that the proposed field at Admire would constitute a hazard to aviation.

The York Port Authority estimated that the field could be constructed for about $4 million and it was authorized to float a $1-million bond issue to get the project under way. The Pennsylvania Air National Guard planned to help in the financing because it wanted a jet training facility there, and in the fiscal 1957 federal aid-to-airports program, $275,715 was allocated for runways, taxiways and lights. All activity on the program is now at a standstill pending a court decision.

At the first days hearing, on January 3, Hostetter testified that his field is licensed by the Pennsylvania Aeronautics Commission as a Class II Commercial airport. It has a 4,200-foot-long hard-surfaced main runway and 1,980-foot sod cross runway. By acquiring additional land, Hostetter said, his airport could be expanded to provide for jet planes of the Air National Guard.

After the first day's hearings, the case was recessed for "six or seven" weeks because of the press of other court business.

Although the case is being tried in a local court, the Court of Common Pleas of York County, the case has generated more than local interest.

Civil Aeronautics Administrator James T. Pyle went to York before the trial, concluded after conferring with local officials that there was little CAA which handles federal aid funds, could do until the local issues were settled.

Aviation Honors

B. L. Whelan, vp of United Aircraft Corp., elected chairman of AIA's Helicopter Council, succeeding **Don Berlin,** president and board chmn. of Vertol Aircraft Corp.

Dr. B. D. Thomas appointed Director of Batelle Memorial Institute, succeeding **Dr. Clyde Williams,** who retains the presidency.

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West Coast Talk . . . By Fred S. Hunter

- **CAA losing good men through retirement.**
- **North American testing small utility jets.**

RETIREMENT has cost Walter Plett, CAA 4th Region administrator, some good men recently. Airport Engineer Stanhope S. Boggs is one. Boggs had the distinction of piloting the first airmail flight from Salt Lake City in June, 1920. On one mail flight, when his engine failed and the fog was heavy, he almost accomplished a landing in San Francisco's Market Street. Transmission lines interfered and the plane didn't make it. But Boggs and the mail did. He continued as an airmail pilot until the government turned the service over to private enterprise in 1927. Then he became Airways Extension Superintendent in the old Lighthouse Service.

Hunter

* * *

Another is Armer M. Alcorn, chief of the aircraft engineering division. He started flying in World War I, in the British Royal Flying Corps, and is still an active pilot. He's flown everything from Jennies to jets, including the Boeing 707 prototype. He became an aeronautical inspector in the Bureau of Air Commerce in 1929. Alcorn directed the preliminaries in the CAA's program for type certification of the forthcoming turbine-powered transports, the Boeing 707, Douglas DC-8, Lockheed Electra and Convair 880. This task will be finished by his successor, W. A. Klikoff. It will be a tough job. The new-type power presents many problems. These will be made all the more difficult by the critical engineering shortage. The CAA 4th Region has 27 unfilled openings for aircraft engineers.

* * *

Terrible thing happened the other day. A sonic boom from a jet flying over Pasadena busted a 16-year old girl's Elvis Presley album . . . George Cussen, Flying Tiger v.p., says he's going to wear only brown suits to match the color tone of his new Lincoln, which he adds the bank lets him drive three days a week . . . Herb Fisher, chief of aviation development division of the New York Port Authority, on one of his trips west, rode from Lockheed to Palmdale with Volkswagen Pilot Tony LeVier, and now figures Tony's Volkswagen will some day make from Burbank to Edwards Air Force Base almost as fast as some of Lockheed's latest designed aircraft.

* * *

North American Aviation has been running some additional wind-tunnel tests on its small utility jets, working out some refinements in the aerodynamics. No major revisions. North American, incidentally denies the report its budget for development and flight testing of the twin-engine turbojet craft is $5,000,000. It's $6,000,000. Since we're on the subject of North American, we might note that all of the F-86D interceptors to be retained in the Air Force inventory will be updated to F-86Ls. No information has been released on the number of F-86Ls to be retained, but it undoubtedly is substantial, since modification of the F-86Ds is being performed at three locations: North American's modification centers at Los Angeles and Fresno and the Air Force depot at Sacramento. North American manufactured something over 2,000 F-86Ds.

* * *

The two most remote gate positions at the Los Angeles International Airport after it builds its new terminal building will be one mile apart. A nice walk for a connecting Passenger.

* * *

Summers Gyroscope's expansion has spread it into 10 plants within a half-mile radius in Santa Monica . . . Lockheed is scheduled to get 22 dash 13 engines for the Electra from Allison this year . . . Out at Ramo-Wooldridge they refer to the new nine-unit research and development center now nearing completion as "the south 40." There must be a farm boy or two among all those Ph.D.s at R-W.

* * *

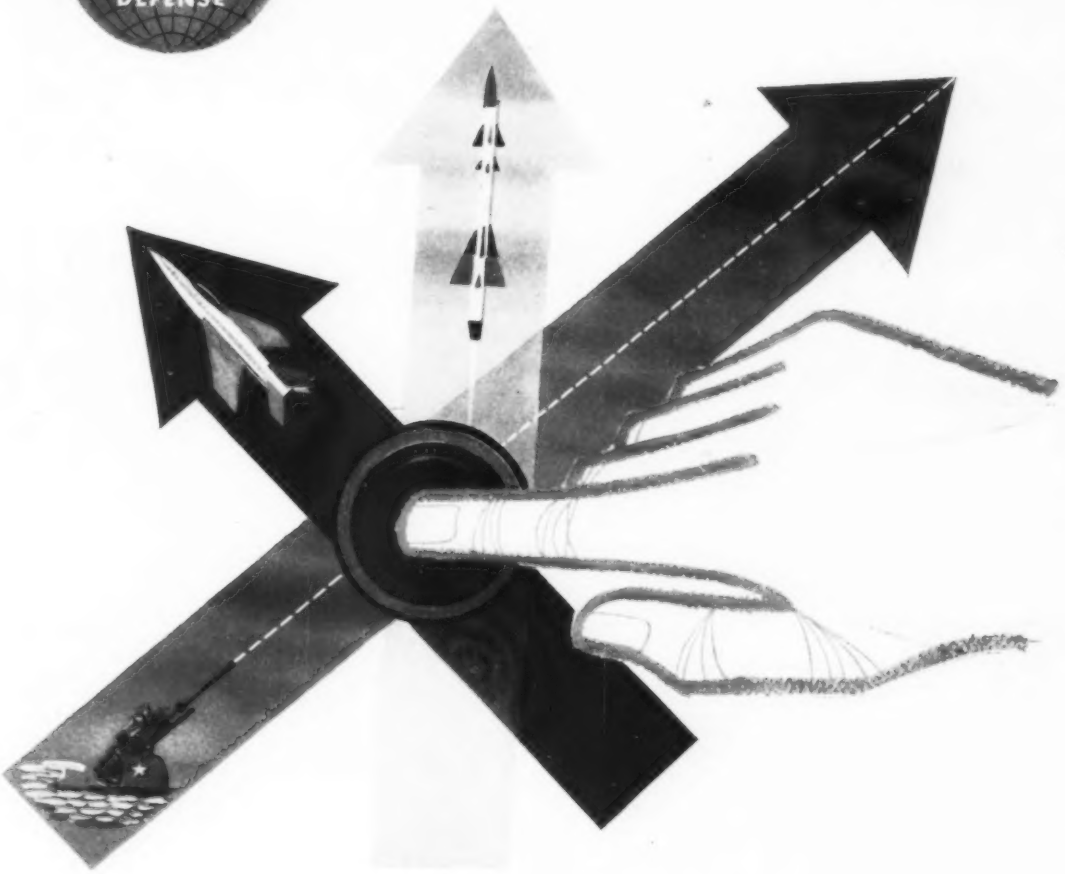
New Control tower is about completed at Casper, Wyo. and the CAA boys who will man it couldn't be happier. They've been sweating it out in an old wooden Army tower and on several occasions have had to abandon it when gusty 75 mph winds whipped around it.

* * *

It's cheaper for a movie company to shoot a Miami Airport scene at the Long Beach Municipal Airport than in Miami, but it has its problems. The other day a company finished up just such a scene—then discovered a United Air Lines plane had arrived during the shooting, and had to do it all over again. Even the movie people know United doesn't put in at Miami.

THE BUSINESS OF AMERICA'S DEFENSE

IBM IN ACTION



HOW DOES AMERICA COME TO "READY ARMS"?

In an age of push-button warfare, turning defense needs into combat-ready realities is no simple matter. America's answer is weapon systems management—a team-up of a broad cross-section of the military and American industry to produce a complete weapon or combination of weapons.

Typical is Project Sage air defense warning and control system—one of the Air Force's most vital projects. This weapon system was conceived in response to an Air Force outline of specific defense problems. The development and production of the computer, heart of the system, were entrusted to IBM.

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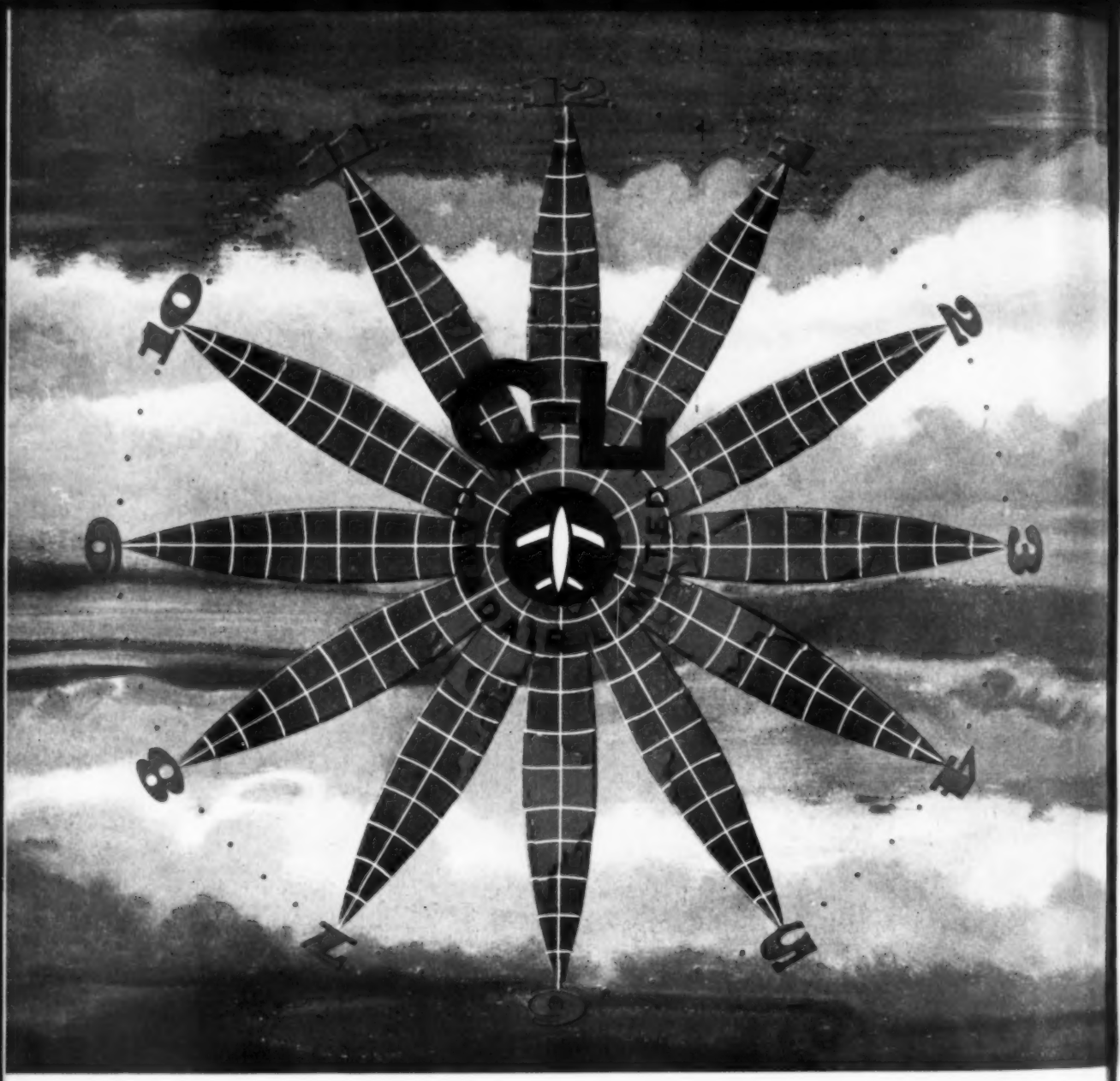

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CANADAIR HAS PRODUCED MORE JET AIRCRAFT THAN ANY OTHER CANADIAN MANUFACTURER

TRANSPORT TRENDS Washington, D. C., Jan. 28, 1957

AIRWAYS USER CHARGE LEGISLATION is very likely to be introduced at this session of Congress. President Eisenhower said in his budget message: "Government aids to aviation confer substantial special benefits upon the users of the airspace. As the cost of these benefits rises, it becomes increasingly appropriate for the users to share with the general taxpayers in paying for them." User charges have been referred to in previous budget messages. But this year's statement is the most definite yet.

Budget Bureau is spearheading a thorough study of user charges. It's unlikely, however, that the study will be finished in time for the Administration to propose legislation at this session. But the House Appropriations Committee is expected to act when it sees the fiscal 1958 CAA budget of $385 million—with about 85% going for airways and traffic control. One possibility is a user charge rider to the appropriations bill.

•

DEFINITE PLANS FOR PUBLIC HEARINGS on the apparent "leak" of CAB's decision in the New York-Florida Case have been made by Senate Investigating Subcommittee, headed by Sen. John McClellan (D.-Ark.). Date hasn't been set, however. Recent rumors that the investigation, which involves big names in and out of aviation, may be sidetracked are "totally untrue," subcommittee members say.

•

IF AIRLINES FAIL to adopt some kind of a penalty system for late cancellations and no-shows (see page 12), there's a chance the present Minimum Time Limit plan will be scrapped. Late cancellation and no-show problem was to be attacked in two phases: (1) MTL, designed to get tickets in customers' hands well ahead of departure time, became effective last September; (2) penalty plan was to start early this year, if okayed by Air Traffic Conference members. But airlines are still widely split on penalties. Next chance for action is April meeting. And ATC resolution setting up the two-part program provides that if both phases aren't in operation by June 1, 1957, the entire resolution is rescinded as of that date. If this happens, the CAB, which has been pushing carriers for action, may come up with a plan of its own.

•

HERE'S HOW THE POST OFFICE makes out on domestic air mail: In fiscal 1958, P.O. estimates that airlines will carry 2,121,829,000 pieces of mail. They'll be paid $40,675,000 (service pay, including no subsidy). This averages out to 1.92c per piece—same average as fiscal 1957. Under a 6c postage rate, this leaves the P.O. 4.08c—plenty to cover ground transport, sorting, overhead, etc., and to show a profit.

•

THERE'S A ROUND OF demonstrations of European transport aircraft ahead for the U.S. Scottish Aviation's STOL Twin Pioneer was due to arrive this month. In April, the Caravelle will start an extensive tour lasting a couple of months. The French jet will come from South America, where it will be demonstrated starting in late March. The de Havilland Comet 3 and D. Napier & Sons' Convair 340 with Eland turboprops are also scheduled for U.S. demonstrations in the first half of 1957.

Now the "Flying Scot" symbolizes Delta's broad network of aircoach services

To 20 cities in Delta's domestic network, the "Flying Scot" now brings the Value, the Comfort and the Speed of Delta's aircoach service. And just as Delta pioneered coach service over all of its basic routes, so in early February will another "first" be added when the "Royal Scot," the first DC-7B daycoach, begins non-stop service between Chicago and Miami . . . the fastest daycoach service on this route!

One of America's Pioneer Scheduled Airlines

Delta AIR LINES

General Offices, Atlanta Airport, Atlanta, Georgia

Douglas Sets Sights for Shorthaul Market

Reliable sources say company is working on 40-44 passenger turboprop DC-3 replacement price-tagged at under $1 million.

By JOSEPH S. MURPHY

DOUGLAS AIRCRAFT CO., with better than $500 million in big jet airline orders on the ledger in Santa Monica, is casting its eyes on the next transport plum—the shorthaul market.

Although company officials steadfastly deny any significant activity in this direction, reports persist that a Douglas replacement for the DC-3 is fast taking shape. New project, presumably to be called the DC-10, is understood to be headed personally by Donald Douglas, Jr.

Basic Douglas configuration, according to reliable industry sources, calls for a 40-to-44-passenger aircraft capable of operating from 2,500 ft. runways at full gross weight and cruising at 320 knots. Douglas target for a price tag is said to be less than $1 million.

• **Only remaining obstacle** to a formal bid with the new design, AMERICAN AVIATION learned, is the security classification of the engines it would use. Reports are that the powerplants are four 1,500 hp turboprops weighing about 700 lbs. each, very closely resembling figures previously cited for the still-classified Lycoming T55.

Using these basic design features, the Douglas 1961 vintage shorthaul transport shapes up as an aircraft of the approximate dimensions of the present-day Vickers Viscount, but having larger, more efficient engines, improved airport and cruise performance, and better economics.

The imminent bid by Douglas in the shorthaul field comes as no surprise. It has long been conceded that, second only to the success of its big-jet DC-8, the Santa Monica firm prizes the so-called "DC-3 replacement" business next. Now that the matter of break-even sales of the DC-8 is no longer a problem, the path is clear for an all-out campaign among shorthaul operators in the U.S. and abroad.

Hinted Year Ago

First hint of the Douglas activity in this field came almost a year ago when J. B. Edwards, asst. chief engineer at Douglas Santa Monica, pegged the company's DC-3 replacement for 1961 availability.

At that time Edwards described the proposed design as featuring a straight, high wing of large area and using big flaps. The big wing area, flaps and powerful engines, he said, would all help short takeoff and landing performance, but added that Douglas would use still-secret devices to further aid this.

Douglas reportedly was considering a form of hinged-wing application for its shorthaul transport several years ago, but it is not known whether this concept is currently being retained in its plans.

• **The timing** of the Douglas move may prove to be perfect. With equipment plans fairly well laid for the larger U.S. trunks and regional carriers, emphasis is now shifting to the plight of local service airlines in shaping their future. The big problem—lack of a firm Civil Aeronautics Board policy that would enable this group of carriers to finance the cost of expensive, but vastly more economic, aircraft.

However, the prospect of increasing awareness of this problem both in CAB and in the Commerce Department is evidenced in recent developments. Board staff personnel have exhibited a growing interest in recent months in the specific performance data of proposed feeder line aircraft, and the Board itself, reportedly has queried manufacturers on their equipment plans.

Undersecretary of Commerce for Transportation Louis B. Rothschild, when queried recently on the prospects of government support for development of a "DC-3 replacement," hinted that this might not prove at all necessary, a sure index of current top-level interest in Commerce in the problem.

• **Just what** is the market for a DC-3 replacement among the feeders? Today these carriers are operating some 215 transports—199 DC-3s, 12 Martin 2-0-2s and four Convair 240s. (See chart.)

Orders placed for new aircraft, all for Fairchild/Fokker F-27 twin turboprops, total 27 firm commitments and 23 additional options placed by five U.S. carriers. Using the combined DC-3 fleets of these carriers as an index, they represent approximately 25 percent of the initial market potential in the local service airline industry.

On this basis alone, the immediate market potential can be pegged at 175 aircraft with no allowance for additional foreign orders or for repetitive orders certain to come from the feeder lines to meet traffic demands generated by the new equipment.

New Types of Customers

But whether it be Douglas with its DC-10 or Fairchild with its F-27, the manufacturer faces a new type of customer in the local service lines. Although each wants to be first in service with replacement equipment, there is no direct competitive feature of their route operations that influences equipment decisions such as faced United, American and others in their DC-8 versus 707 buying.

Feeder Airline Transports

Here's how the local service airline transport table shaped up as of September 30, 1956 with orders and options for replacement equipment listed by carrier:

Airline	Douglas DC-3	Martin 2-0-2	Convair 240	Fairchild F-27 Orders	Fairchild F-27 Options
Allegheny	15	5	..	..	..
Bonanza	9	..	..	3	3
Central	12	..	..	..	..
Frontier	13	..	..	2	4
Lake Central	10	..	..	..	..
Mohawk	9	..	4	..	..
Ozark	18	..	..	..	..
North Central	21	..	..	..	..
Ozark	18	..	..	..	..
Piedmont	19	..	..	12	12
Southern	13	..	..	..	..
Southwest	10	7	..	..	..
Trans Texas	18	..	..	..	..
West Coast	14	..	..	4	4
TOTALS	199	12	4	21	23

The DC-3 replacement is a transport that will have to be sold on its merits alone exclusive of competitive pressures. Fairchild got there first with its F-27 and cornered the first share of the orders.

But there is still a good 75% of the market to be tapped in the coming months—and it's a good bet that Douglas Aircraft Co. will be in the competition, to make sure the "DC-3 replacement" doesn't wind up with another manufacturer's label. ◈◈◈

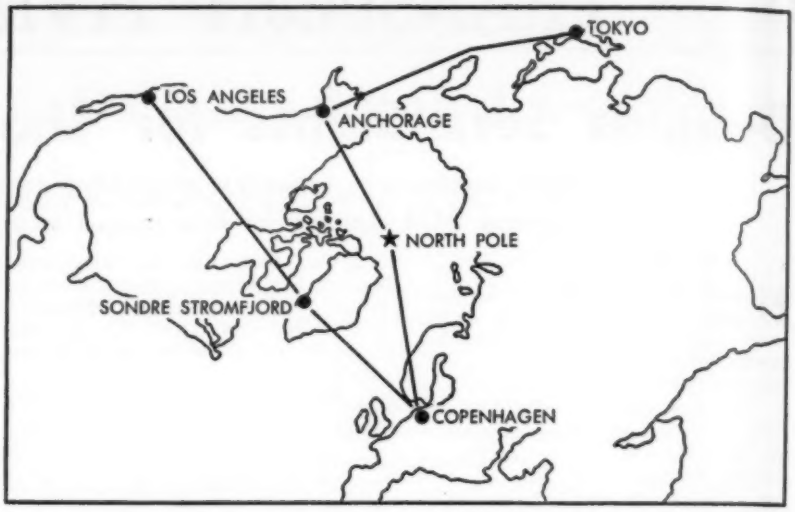
DC-3/4 Workhorses

Latest tabulation of fixed-wing aircraft in U.S. domestic scheduled airline services shows that 31.6% are prewar-type DC-3s and DC-4s. There still are 298 DC-3s and 97 DC-4s in service, according to Civil Aeronautics Administration.

New Training Center

Western Air Lines broke ground for its $1-million training center at Los Angeles International Airport. New building will provide technical training facilities for WAL's pilots, flight engineers and stewardesses.

SAS to Fly 'Short-Cut' from Europe to Japan



Scandinavian Airlines System will open a "short-cut" route from Europe to Japan on February 24. Douglas DC-7C equipment will be used to shave 22 hours off the normal time from Copenhagen to Tokyo (via the Near East and India) by flying a new route across the North Pole with only one stop—Anchorage, Alaska.

Initially, SAS will operate two combination-class flights weekly on this new route. SAS is no newcomer to polar flying. In November 1954 it pioneered polar service with a new route from Copenhagen to Los Angeles. This route has proved so successful that it is operated on daily basis in the summer.

Enforcement of Baggage Limit Aids Airlines

Air Traffic Conference official says carriers benefited by $1 million in second half of 1956, as compared with second half of '55.

By ERIC BRAMLEY

Stricter application of the 40-lb. free baggage allowance benefited the domestic airlines to the tune of better than $1 million in the second and third quarters of last year as compared with the same 1955 periods.

So says the Air Traffic Conference's enforcement office, whose investigators have been checking constantly to see that the carriers don't allow passengers to sneak through with extra poundage. Some lines have been fined for violations.

• **To show** the monetary effect of enforcing the 40-lb. limit, Fred Davis, director of the enforcement office, has sent ATC members compilations covering the second and third quarters of last year (see tables).

"In order to make the comparisons indicated, the percentage ratios between excess baggage revenues and passenger revenues were calculated for each carrier and the total industry . . ." Davis explained. "The change in this ratio (between the 1955 and 1956 quarters) was then figured on a percentage basis, and the revenue gain or loss in 1956 calculated . . .

"In other words, the final column (in the tables) reflects the difference between excess baggage revenues actually collected . . . and what would have been collected if collections had been made at the ratio achieved by each carrier in the same period of 1955."

For example, in the 1956 third quarter, American Airlines' excess baggage revenue amounted to 1.1% of its passenger revenue, an increase from 0.94% in the same 1955 period. This increased ratio in 1956 added $113,998 to AA's excess baggage revenue for the quarter.

Davis said that this type of an analysis "eliminates the factors of seasonality and traffic growth, the former by using identical calendar periods, and the latter by developing the ratio between the two sources of revenue."

• **ATC's enforcement office** was formed Jan. 1, 1956, to police the rules applying to carriage of all forms of traffic. The first quarter of 1956 was a period of organization.

And Davis pointed out that in that quarter, before investigators started checking, the industry achieved a *lower* ratio of excess baggage collections to passenger revenue than in 1955. Thus, the second and third quarter represented a marked reversal of the previous trend.

Discussing excess baggage at the ATC meeting late last year, Davis said:

"It must be emphasized that this is a matter that continues to require active supervisory attention. Performance is spotty, and remains an enforcement problem. Within recent months formal violation cases relating to failure to collect excess baggage charges have been processed, and have resulted in the assessment of fines. Similar action will continue to be taken as the circumstances require."

The enforcement office has been mum on the size of fines levied—the industry receives no reports on violations and fines ("The deterrent effect of our actions can be accomplished on an industry-wide basis just as satisfactorily by means of the publication of general information, without causing embarrassment to any individual carrier or person," Davis said).

However, officials insist that no fine has approached the $25,000 maximum which can be levied. And as yet no carrier has taken a case to arbitration, which may be done under the enforcement office's rules. Davis has stated that in many cases situations have been corrected by warnings and by conferences with carriers, rather than by assessment of fines.

The enforcement office has only three employes, but they travel constantly. They almost always carry up to 10 lbs. more than the 40-lb. baggage limit, and they make no effort to hide the excess. If they aren't charged for it, warnings or fines result.

Collection of Excess Baggage Charges

Domestic Conventional Passenger Airlines

SECOND QUARTER, 1956 and 1955

(1) CARRIER	(2) Total Passenger Rev.—1956	(3) Excess Baggage Rev.—1956	(4) Ratio, Excess Baggage Rev. to Total Passenger Revenue 1956	(5) 1955	(6) Gain or Loss 1956 over 1955 In Ratio	(7) In Revenue
Allegheny	$ 1,200,335	$ 5,684	0.47%	0.43%	9.30%	$ 523
American	68,939,422	667,172	0.98	0.96	2.08	5,354
Bonanza	426,726	4,629	1.08	0.67	61.19	1,770
Braniff [1]	10,849,196	115,301	1.07	0.96	10.40	11,149
Capital	15,299,743	103,560	0.68	0.58	17.24	14,822
Central	299,326	1,980	0.66	0.72	(8.33)	(165)
Colonial	1,563,015	20,490	1.31	1.33	(1.50)	(298)
Continental	4,047,399	36,537	0.90	0.68	32.35	9,015
Delta [1]	15,938,395	250,618	1.57	1.26	24.60	49,795
Eastern	53,593,558	950,906	1.77	1.55	14.20	120,206
Frontier	740,442	6,894	0.93	0.99	(6.06)	(436)
Lake Central	356,556	1,568	0.44	0.42	4.76	71
Mohawk	1,180,970	5,201	0.44	0.27	62.96	2,013
National	13,032,571	407,949	3.13	2.38	31.51	97,774
North Central	1,593,553	8,753	0.55	0.61	(9.84)	(967)
Northeast	2,023,228	13,996	0.69	0.64	7.81	1,048
Northwest [1]	12,062,484	121,015	1.00	0.81	23.46	23,309
Ozark	821,915	5,077	0.62	0.52	19.23	804
Piedmont	1,298,303	10,570	0.81	0.81	—	—
Southern	496,124	4,197	0.85	0.46	84.78	1,915
Southwest	753,947	1,946	0.26	0.32	(18.75)	(466)
Trans-Texas	752,991	5,995	0.80	0.63	26.98	1,251
Trans-World [1]	41,125,317	397,881	0.97	0.97	—	—
United	62,047,703	775,910	1.25	1.11	12.61	87,181
West Coast	561,394	2,603	0.46	0.33	39.39	751
Western	7,435,749	50,988	0.69	0.63	9.52	4,143
Total	$318,440,362	$3,977,420	1.25%	1.11%	12.61%	$442,732 [2]

[1] Domestic Only.

[2] This figure is slightly higher than total of individual gains and losses due to rounding off of percentage figures.

THIRD QUARTER, 1956 and 1955

Allegheny	$ 1,300,465	$ 6,088	0.47%	0.43%	9.30%	$ 496
American	69,261,603	765,057	1.10	0.94	17.02	113,998
Bonanza	416,444	3,225	0.77	0.58	32.76	810
Braniff [1]	10,159,507	115,392	1.13	0.86	31.40	28,021
Capital	16,341,395	123,221	0.75	0.60	25.00	25,173
Central	305,070	2,115	0.70	0.56	25.00	407
Continental	4,267,721	40,934	0.96	0.69	39.13	11,487
Delta [1]	14,545,526	198,449	1.37	1.10	24.55	38,449
Eastern [2]	49,980,920	832,010	1.67	1.40	19.29	132,278
Frontier	824,390	8,383	1.02	0.88	15.68	1,129
Lake Central	349,852	1,675	0.48	0.42	14.30	206
Mohawk	1,123,777	5,249	0.47	0.28	67.85	2,103
National	10,000,145	260,325	2.60	1.91	36.13	69,323
North Central	1,845,550	14,648	0.79	0.67	17.91	2,283
Northeast	2,927,719	28,719	0.98	0.84	16.55	4,127
Northwest [1]	13,232,908	133,269	1.01	0.81	24.69	26,083
Ozark	850,141	5,341	0.63	0.66	(4.55)	(269)
Piedmont	1,337,337	11,283	0.85	0.71	19.72	1,788
Southern	503,741	4,135	0.82	0.42	95.24	2,020
Southwest	885,687	2,321	0.26	0.31	(16.13)	(424)
Trans-Texas	805,011	6,300	0.78	0.70	11.43	665
Trans World [1]	44,013,513	453,432	1.03	0.96	7.29	17,060
United	65,999,334	856,045	1.30	1.05	23.81	163,052
West Coast	596,681	2,652	0.44	0.34	29.41	624
Western	9,039,149	68,073	0.75	0.67	11.94	7,511
Total	$320,913,586	$3,948,341	1.23%	1.03%	19.41%	$642,932 [3]

[1] Domestic Only.

[2] Includes Colonial

[3] This figure is slightly lower than total of individual gains and losses due to rounding off of percentage figures.

THE ERA OF THE ELAND IS BEGINNING...

The case for ELAND conversion

To forward-looking operators of medium-haul airlines the case for ELAND conversion becomes clearer and more convincing month by month. Increasingly they see that ELANDS point the way to the achievement of better performance, greater earning capacity, and greater dependability in service from well-proven airframes.

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ELANDS possess to the full that inherent asset of the turbo-prop—a greatly reduced noise level. And over and above this they have an inherent asset of their own—a complete absence of beat, whine or whistle. The passenger appeal implicit in this needs no emphasis.

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The Napier Eland Convair—a Convair 340 which we bought from the makers and converted to ELANDS—has proved the simplicity of ELAND installation, the low lost of conversion and the increased profits that accrue from ELAND operation.

From studies made of the published direct operating costs (including depreciation) of a number of typical airlines, it is proved that in the light of our guarantees a converted aircraft will be cheaper to operate—whether the costs are calculated on the basis of aircraft miles, ton miles, or passenger miles. The ELAND-engined Convair 340 can carry its maximum payload 930 miles further than piston-engined Convairs, and its cruising speed is 50 m.p.h. higher.

In short, we offer to operators of the Convair—and other medium-haul 'planes—an airliner with a new lease of life at a cost which will be written off over a relatively short period. That is the essence of the case for ELAND conversion.

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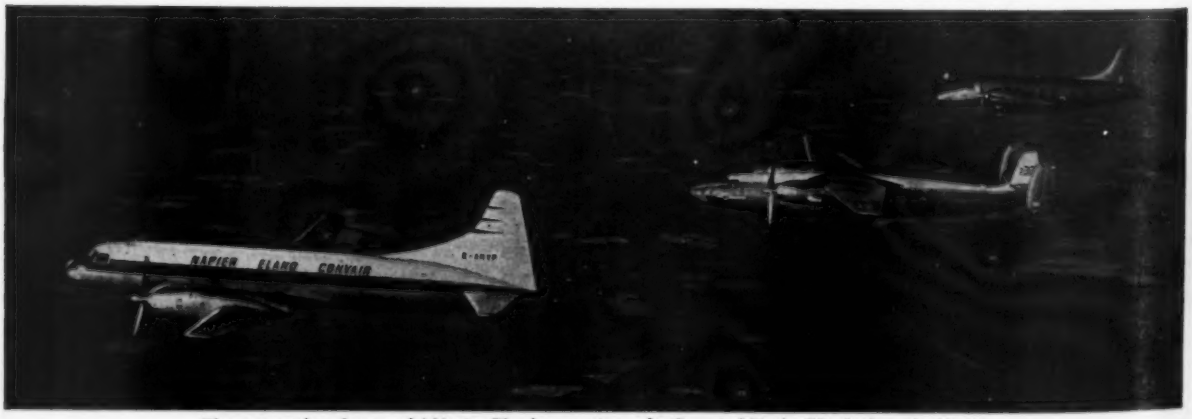


Three examples of successful Napier Eland conversions: the Convair 340, the Elizabethan, the Varsity.

CRC 825

Aeroflot is Odd Mixture of Old and New

Russian airline flies jets from Moscow to Prague in 2 hrs. 50 min.; piston aircraft are ancient and airport buildings ornate.

By ANTHONY VANDYK

Which is the only airline in the world to operate jet equipment at the present time? Which is the only major carrier in the world never to have flown pressurized piston-engine equipment? Answer to both these questions is Aeroflot.

This anomalous situation is typical of the general set-up with the Russian airline. To a Western observer Aeroflot is a most extraordinary mixture of ancient and modern.

Aeroflot's winter international timetable is representative of the confused situation prevalent in the airline. On the cover of this timetable is a piston-engine Ilyushin I1-14 while inside considerable space is devoted to "house ads" about the Tupolev Tu-104 jet transport.

Reflecting the Russians' pride in their new aircraft, the timetable advertises that the Tu-104 now links Moscow with Prague in 2 hrs. 50 min. and with Paris (by Air France connection in Prague) in 7 hrs. 40 min. The jet is also in service on the long transcontinental route from Moscow to Omsk and Irkutsk in Siberia, the Moscow-Tiflis run and the Moscow-Tashkent service.

In its advertisements for the Tu-104 services Aeroflot stresses that passengers are provided with "free hot food" aboard. This is a novelty for passengers on the Russian airline. Piston-engine aircraft used by Aeroflot do not carry galleys so passengers are given meals during ground stops.

Cover of Aeroflot's 1956-57 winter timetable shows an old Il-12 flying over Moscow. Inside the publication, however, particular attention is paid to publicizing the recent introduction of the Tupolev Tu-104 jet into scheduled service.

Typical of elegant but non-functional airports erected by Russians in recent years is terminal at Riga. Chandeliers and columns make interior even more ornate than exterior.

At the same time that Aeroflot is revamping its operations by introducing Tu-104s, it is improving the quality of its piston-engine equipment by bringing into service a new, improved version of the I1-14, the I1-14M. Until 1960, the I1-14M, the I1-14 and the I1-12 will remain the workhorses of the Russian airline system. The Li-2s (DC-3s) are gradually being replaced by these three types which date from a wartime design.

The I1-12 made its first flight eleven years ago and remained in production until recently. The I1-14 was phased in starting about 1953. The difference between the two models is very slight except for the I1-14's larger tail unit.

Latest version of the I1-14, the I1-14M, is longer than its predecessor as a result of the introduction of a 39-in. extension to the fuselage forward of the wing. The gross weight is increased to 37,950 lbs. while the speed and range are also up—to 258 mph and 930 miles, respectively.

Takeoff Run Increased

On the debit side, takeoff run has been increased by about 165 ft. However, stability on takeoff and landing is said to have been improved. Use of more powerful engines makes the I1-14M able to climb safely on one engine if the other fails at the critical point on takeoff at full gross weight.

The speed of the Tu-104 and, to a much lesser extent, the I1-14M, will be appreciated by Aeroflot passengers who have been accustomed to riding at well under 200 mph in the I1-14s, I1-12s and Li-2s which perform the bulk of the flying in Russia today. Most flights in the Soviet Union not only are flown by slow aircraft but feature several lengthy meal or rest stops en route.

Until recently most long-haul flights did not continue through the night. During hours of darkness the aircraft remained on the ground and passengers were accommodated at special hotels.

Apparently reflecting an improvement in night flying facilities, overnight stops are now the exception rather the rule on Aeroflot services. The main airports today have far better aids than the non-directional beacons which were all there was in the immediate post-war years.

Western visitors to Russia have been told by Aeroflot officials that ILS and GCA are general through the nation but actual experience does not entirely confirm these claims. Last year this writer's I1-12 was held at Riga because of a regulation that aircraft may not take off until the airport of arrival has weather suitable for landing.

In this particular case the airport of arrival was Vnukovo, Moscow's commercial airport, which should have the best facilities of any of the nation's fields. Only when the weather cleared at Vnukovo was the I1-12 allowed to take off from Riga.

Considerable airport improvement work is under way in Russia. About 40 new air terminal buildings are scheduled to be completed by 1960. These terminals are likely to be more functional than the edifices erected in recent years. The latter have evoked considerable criticism within the Soviet Union. Aeroflot's official publication was responsible for a decision to cut the frills in future buildings and to follow for-

eign practice in new design. The organ had noted that architects of recently built facilities sacrificed passenger comfort and convenience to "the artistic sham of ornamented interiors and showy facades."

Particular criticism has been directed at the buildings erected at the Riga, Wilno, Lvov and Alma Ata airfields. Certainly, the expense in providing the huge decorative columns and chandeliers at Riga must have been very high.

At the moment no Russian airport buildings are designed for present-day traffic flow. Even the latest facilities are more showplaces than entities of a transportation system. In this respect they follow the example set by Moscow's subway which has achieved fame because of its lavish and non-functional stations.

The improvement of Russian airports and navigational systems together with the introduction of aircraft with longer ranges is making it possible for Aeroflot to expand and streamline its operations considerably. A new link from Moscow to Vorkuta and Norilsk in northwestern Siberia will cut present flying time almost by half.

Other Routes Planned

Other important new routes projected by Aeroflot will give Leningrad a direct link with Sverdlovsk (via Molotov); at present passengers have to fly via Moscow and Kazan. Another direct flight from Leningrad will connect that city with Tiflis via Rostov.

Direct trans-Siberian service will be offered from Moscow to Petropavlovsk via Novosibirsk, Yakutsk and Magadan. This northly route assumes increased importance because of the improvement of navigational aids available to Aeroflot.

While trunk services are being improved Aeroflot is also devoting attention to its local service operations. Increasing use is planned for the Yak-24 twin-rotor helicopter which can carry sizeable loads (up to four tons). Basic Aeroflot policy, however, is to restrict helicopter service to areas where normal airplane or surface transport is difficult.

What does all this development mean? Simply that Aeroflot is trying hard to emulate the success of western operators. For the first time ever the Russian airline has the edge on its western counterparts in one area—jet transportation. The Aeroflot planners are now trying hard to improve their airline in other areas by studying the techniques and methods used by their foreign competitors. There is still a long way to go. ◆◆◆

Summary of U.S. Domestic Airline Traffic for November, 1956 Vs. November, 1955

Compiled by American Aviation Publications from Official C.A.B. Data.

Airlines	Revenue Passengers			Revenue Passenger Miles (In Thousands)			Total Ton-Miles Rev. Traffic			% Available Ton-Miles Used	
	1956	1955	% Change	1956	1955	% Change	1956	1955	% Change	1956	1955
DOMESTIC											
American	619,096	584,001	6.0	366,169	336,179	8.9	45,934,164	41,388,017	11.0	58.10	62.06
Braniff	150,872	133,540	13.0	62,580	49,167	27.3	6,698,915	5,250,528	27.9	48.68	52.47
Capital	265,043	199,788	32.7	95,038	62,588	51.8	9,896,941	6,807,663	45.4	46.37	44.46
Caribair	14,221	10,551	34.8	973	777	25.2	91,966	75,818	21.3	61.00	46.67
Continental	58,112	49,911	16.4	21,009	18,228	15.3	2,216,443	1,945,589	13.9	45.66	44.06
Delta	196,651	168,804	16.5	90,954	72,520	25.4	10,041,429	8,056,960	24.6	53.33	56.92
Eastern	602,955	529,864	13.8	282,516	255,938	10.4	32,095,357	29,260,161	9.7	45.96	47.11
Hawaiian	29,966	27,634	8.4	4,095	3,711	10.3	456,694	456,053	0.1	54.98	49.63
National	103,698	87,835	18.1	66,980	57,797	15.9	7,593,203	6,593,441	15.2	61.33	60.40
Northeast	43,813	39,252	11.6	8,824	7,769	13.6	867,621	768,502	12.9	52.44	55.74
Northwest	100,647	89,015	13.1	63,098	58,319	8.2	7,651,054	7,060,201	8.4	50.63	49.92
Trans-Pac.	12,568	12,426	1.1	1,526	1,537	—0.7	132,667	127,446	4.1	51.87	44.94
TWA	342,122	310,571	10.2	250,767	228,835	9.5	28,215,014	25,937,762	8.8	51.03	56.53
United	470,052	405,189	16.0	310,236	264,083	17.5	37,709,435	31,186,507	20.9	56.13	52.16
Western	99,741	87,710	13.7	46,281	39,496	17.2	4,975,988	4,298,204	15.8	52.17	51.20
TOTALS	3,109,557	2,736,091	13.6	1,670,986	1,456,944	14.7	194,576,891	169,282,852	14.9	52.58	....
INTERNATIONAL											
American	10,548	9,883	6.7	7,322	6,653	10.1	1,085,435	936,491	15.9	61.78	64.68
Braniff	2,670	2,298	16.2	5,793	4,959	16.8	769,229	671,589	14.5	53.03	34.62
Delta	4,519	3,618	24.9	5,081	4,014	26.6	581,298	490,562	18.5	47.40	36.49
Eastern	18,351	14,244	28.8	24,695	19,945	23.8	2,854,147	2,267,494	25.9	49.69	48.19
National	6,772	7,391	—8.4	3,996	4,201	—4.9	466,362	488,606	—4.6	41.91	47.96
Northwest	7,904	6,183	27.8	15,396	12,239	25.8	3,674,340	3,035,505	21.0	66.30	62.55
Panagra	11,536	10,551	9.3	15,114	12,186	24.0	2,073,096	1,610,361	28.7	63.04	51.56
Pan American											
Latin Amer.	87,405	76,450	14.3	83,586	68,554	21.9	13,011,759	10,459,541	24.4	63.56	57.98
Atlantic	65,921	58,397	12.9	91,877	72,846	26.1	13,622,019	10,500,700	29.7	64.04	59.23
Pacific	24,023	18,032	33.2	74,957	52,269	43.4	10,481,913	7,895,262	32.8	62.97	64.47
Alaska	4,660	5,259	—11.4	6,625	10,127	—34.9	999,238	1,346,045	—25.8	49.12	53.55
TWA	15,776	14,265	10.6	43,609	37,665	15.8	6,163,251	5,589,886	10.3	68.29	65.38
United	5,313	5,102	4.1	13,202	12,672	4.2	1,504,962	1,430,415	5.2	47.90	50.88
TOTALS	265,398	231,673	14.6	391,253	318,330	22.9	57,287,049	46,722,457	22.6	61.79	58.17
LOCAL SERVICE											
Allegheny	33,594	25,922	29.6	5,544	4,207	31.8	562,627	425,210	32.3	46.60	44.66
Bonanza	10,926	9,080	20.3	2,421	1,994	21.4	242,593	200,822	20.8	43.79	36.33
Central	8,166	7,389	10.5	1,633	1,310	24.7	167,902	135,334	24.1	29.43	25.49
Frontier	15,530	12,089	28.5	4,196	3,199	31.2	476,446	377,238	26.3	54.55	43.63
Lake Central	11,981	9,325	28.5	1,946	1,489	30.7	199,591	154,626	29.1	42.78	34.25
Mohawk	33,907	26,387	28.5	6,203	4,855	27.8	619,148	480,544	28.8	56.42	49.66
N. Central	41,683	33,542	24.3	6,446	4,930	30.8	660,888	512,641	28.9	44.18	39.65
Ozark	27,806	22,239	25.0	4,314	3,328	29.6	439,453	336,039	30.8	40.84	35.66
Piedmont	33,072	29,754	11.2	6,175	5,597	10.3	631,555	576,059	9.6	51.73	49.96
Southern	16,921	13,932	21.5	3,022	2,379	27.0	308,667	246,751	25.1	43.85	38.88
Southwest	24,417	19,973	22.2	5,403	4,029	34.1	532,686	409,604	30.0	49.14	51.38
Trans-Texas	19,339	13,116	47.4	4,382	2,964	47.8	461,308	313,502	47.1	36.05	36.16
West Coast	15,035	14,036	7.1	2,735	2,455	11.4	262,588	238,569	10.1	50.20	44.90
TOTALS	292,376	236,784	23.5	54,420	42,736	27.3	5,565,452	4,406,939	26.3	45.56	42.10
HELICOPTER SERVICE											
Chi. Helicopter	429	.....	....	7	.....	....	2,727	2,030	34.3	26.81	39.18
Los Angeles	2,027	575	252.5	73	21	247.6	13,205	7,560	74.7	37.50	37.46
N. Y. Airways	4,819	2,344	105.6	92	47	95.7	11,749	7,169	63.9	38.77	54.29

3000 PSI SOLENOID PILOT OPERATED 4 WAY 3 POSITION SELECTOR–

with 125 psi Minimum Actuating Pressure!

This solenoid valve provides electro-hydraulic control of fail safe closed dive or speed brake flaps and permits flaps to be extended and locked in any desired position.

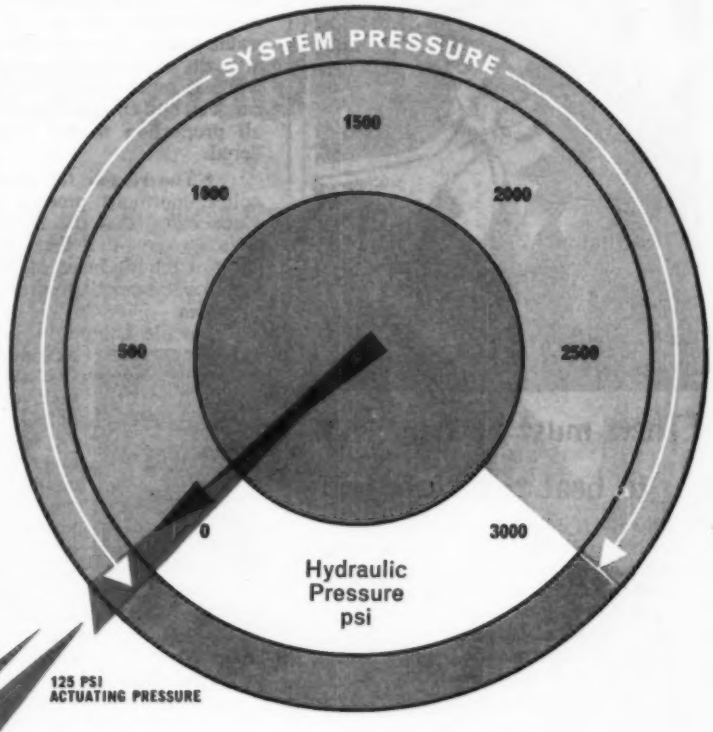
Spring return to neutral is augmented by actuating pressure, assuring positive action even in presence of contaminants or silting.

Operating at extremely low pressures, this Whittaker Solenoid Pilot Actuated 3000 psi non-interflow Sleeve Selector Valve actuates at a pilot pressure of only 125 psi.

It is a high-flow valve—12 gallons per minute for a ¼-inch tube size valve.

Integral filters and provisions for manifold or stacking are provided. (Stacking height is two inches.)

This unit, P/N 119475, is in production. Similar valves, designed to meet your requirements, will be designed at your request.



PERFORMANCE

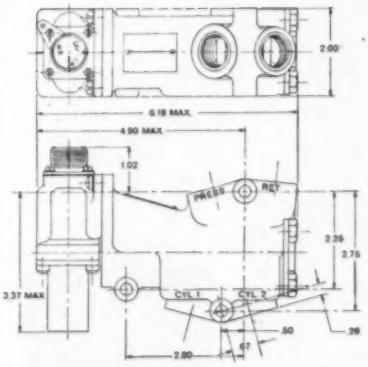
TEMPERATURE. —65°F to +300°F fluid and ambient temperature.

PRESSURE. Operating pressure 3000 psi at —65°F to +300°F.

PRESSURE DROP. Looped pressure drop at 12 gpm is 110 psi.

SERVICE FLUID. MIL-0-5606 Hydraulic Fluid.

ACTUATING TIME. Pilot valves of this type are inherently fast in operation. In this case the speed of operation has been dampened to eliminate extreme surge pressures.



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Wm. R. Whittaker Co., Ltd., 915 N. Citrus Ave., Los Angeles 38, Calif.

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Gentlemen:
Please send me further information on the Whittaker Solenoid Pilot Actuated Sleeve Selector Valve.

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Company_____

Address_____

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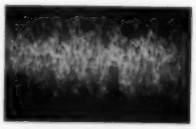
"There must be some way to beat this static!"

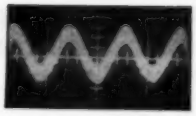
There is! If this aircraft were equipped with a Hoover 2004 Interference Blanker, the pilot could read the tower loud and clear despite the precipitation "noise" which is now crippling his radio reception. He would get reliable reception under adverse conditions . . . when he needs it the most.

Extensive tests of this unit by military and our own laboratories demonstrate remarkable communication improvement in the presence of the impulse static normally encountered in modern high altitude, high-speed aircraft.

The Hoover Interference Blanker—compact in a ¼ ATR package weighing 5½ pounds and using either 28 VDC or 110 VAC prime power—markedly increases the performance and reliability of your vital electronic navigation, direction finding or communication equipment. For complete engineering information, write to Department B-1.



Scope pattern of receiver output with 50 microvolt MCW signal in the presence of precipitation static. Signals less than 2,000 microvolts are not readable.



Scope pattern of same receiver output with Hoover Model 2004 inserted in the antenna circuit. Signals as low as 5 microvolts are readable.

HOOVER ELECTRONICS COMPANY

3640 WOODLAND AVENUE
BALTIMORE 15, MD.
Subsidiary The Hoover Company

Sam Saint Says . . .

Solution for Air Traffic Control?

There is cause for dismay in recommendations of the Lincoln Laboratory of the Massachusetts Institute of Technology for the future of air traffic control. Lincoln offers an operationally unacceptable solution that will take more years to build than we can wait and cost the taxpayers out of all proportion to the services rendered.

• **The reason for dismay:** Lincoln's enormous prestige will convince many that the last word has been spoken—that there is no hope short of the top-heavy, time-consuming development program Lincoln proposes.

SAINT

Lincoln Laboratory was created to conduct a massive scientific attack on the air defense problem. All told, approximately 10 million engineering man-hours have gone into this project in six or seven years. Out of the Lincoln Laboratory have come plans for the gigantic $3-billion SAGE (Semi-Automatic-Ground-Environment) system of air defense.

It should be obvious even to the casual thinker that the SAGE system and the air traffic control system must be intimately related. Both use the same air space. So it was logical for Mr. Curtis to ask Lincoln to study and report on the possible use of SAGE techniques for air traffic control. The Joint Services Advisory Committee (of Lincoln Laboratory) also asked for "a study of the integration of SAGE and air traffic control."

In response to these two requests Lincoln published Technical Memorandum Number 64 on 17 September 1956. The title: "A Proposal for an Evolving Air Traffic Control System."

• **There is probably** no more important question facing ATC developers and policy people than the SAGE/ATC relationship. The Lincoln pronunciamento thus automatically becomes a key document in the search for ways to untangle the air traffic mess.

With commendable candor the report starts with an admission that "the problem has not yet been defined." And further, "there is no common agreement as to the sources of traffic delays." Following this admission, and without apology, the undefined problem is given a specific solution: It is suggested that traffic be "scheduled" to "eliminate holding and excessive delays." Such scheduling to be based on "the acceptance rates of terminal areas." This is blue-sky dreaming. It solves the problem by eliminating excess traffic. It's a neat and tidy solution—for everyone except passengers left standing at gates in rush hours.

Having got past the undefined problem to a specific system concept, however, the rest is easy. Lincoln recommends SAGE-type hardware for air traffic control. This is an all-radar system, with radar information piped through telephone lines to giant computers. The computers in turn create synthetic cathode ray displays for the controllers.

So, with the hardware chosen from the stockroom shelf, it is next possible for Lincoln to figure how long it will take to solve the unknown problem, and how much we will pay for the solution to which we later hope to fit a problem. Based on experience developing SAGE, Lincoln estimates that "the program of work (development) might take 78 months, or nearly seven years, and would not result in a first operational semi-automatic traffic control center until after mid-1963 if work started immediately."

• **The cost of development:** 600 to 900 people will need "$15,000,000 per year" for about seven years. Installation will cost in excess of A BILLION DOLLARS. The cost of operating one center is estimated at "$15,000,000" per year. The operation of 26 centers would, at this rate, cost the taxpayers more than a quarter of a billion dollars a year.

The writer is currently responsible for getting a DC-6 safely from New York to Chicago and back 13 times a month. Each trip adds new evidence that *we can't wait seven years!* Little by little we have accepted more and more hazardous operating conditions—conditions that would have had our hair standing on end a few years ago. We accept half-heard directions from the controller because asking for a "repeat" on the overcrowded frequency would only increase the hazard for someone else.

• **Tell a controller** as he comes off a rough shift that he has to wait *seven more years* for the wonders of the electronic age to relieve the ulcer-producing pressure! His comment may be a little bitter. He's heard before of pie-in-the-sky that never materializes.

A billion-dollar price tag and a yearly operating cost of a quarter-billion (not including the navigation system and other incidentals) is steep indeed for solution of a problem that hasn't yet been analyzed.

Fluoroflex-T TEFLON® hose solves these problems

HANDLING HIGHLY CORROSIVE FLUIDS

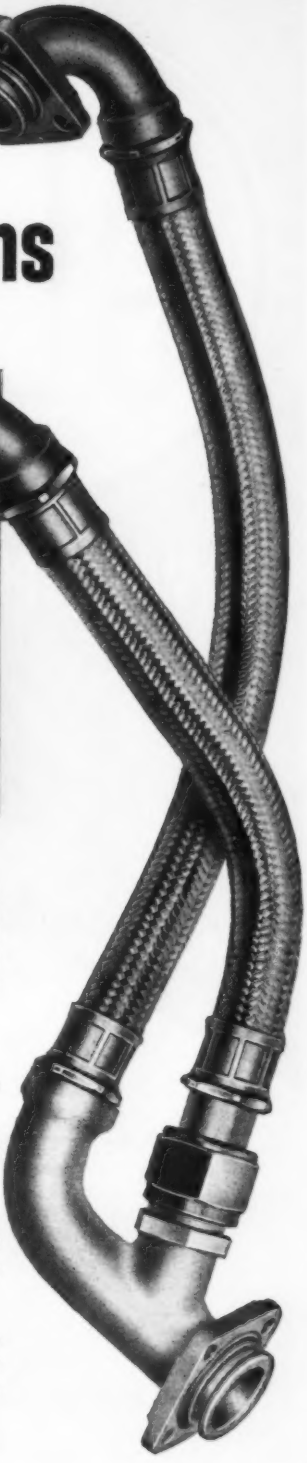
In flexible lines, nothing surpasses a compact, inert Fluoroflex-T assembly for conveying corrosive propellants, nitric acid, MIL-L-7808 oil, and JP-4 fuel.

PERFORMANCE IN VITAL CONTROL JOBS

Fluoroflex-T lightweight assemblies resist "ballooning" under pressure and elevated temperatures . . . assuring instant response in braking and other control systems.

HIGH OR LOW TEMPERATURE SERVICE

Fluids and gases at temperatures ranging from −65°F to +450°F have absolutely no affect on Fluoroflex-T hose assemblies. No aging, no deterioration, no leakage.



FLUOROFLEX®-T hose is the *original* Teflon hose, now proved by *four years flight experience.* With *patented* tube, it assures you high integrity, genuine aircraft quality assemblies. Permanently swaged fittings are both leakproof and blow-off-proof.

Resistoflex offers the widest range of Teflon hose assemblies, preformed configurations, and special combinations of hose and bent tubes. Contact us for specific information on your application.

RESISTOFLEX CORPORATION, Roseland, N.J.; Western Plant: Burbank, Calif.; Southwestern Plant: Dallas, Tex.

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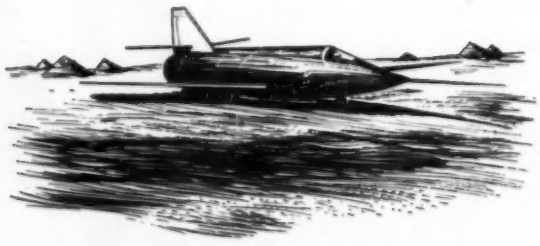

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AIRCRAFT IGNITION AND ELECTRONIC EQUIPMENT

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CAB Nominee

LOUIS J. HECTOR

President has nominated this Miami, Fla. "Eisenhower Democrat" for post left vacant by Vice Chairman Joseph Adams.

CAB Examiners 'Approve' 31 Nonskeds

Thirty-one nonscheduled airlines have been recommended by two CAB examiners as being qualified for whatever authority CAB finally decides to grant in its decision in the Large Irregular Air Carrier Investigation.

At the same time, Examiners Ralph L. Wiser and Richard A. Walsh said that 23 nonskeds were "not qualified" to receive continued operating authority.

CAB's original policy decision in the case has been remanded by the U.S. Court of Appeals. Thus, the examiners' recommendations together with a new policy ruling will be handled simultaneously by the Board.

• **The examiners** found the following companies qualified:

Airline Transport, All-American, American Flyers, Arctic-Pacific, Argonaut, Associated Air Transport, Aviation Corp. of Seattle, Blatz, California Eastern, Capitol, Coastal Cargo, Conner, General, Johnson Flying, Los Angeles Air Service, Meteor, Miami, Modern, Overseas National, Quaker City, Regina, Sourdough, Southern Air, S.S.W., Standard, Stewart, Trans Caribbean, Transocean, U.S. Aircoach, U.S. Overseas, and World.

Listed as "not qualified" were:

Aero Finance, Air Cargo Express, Air Services, Air Transport Associates, American Air Transport, California Air Charter, Central Air Transport, Continental Charters, Currey, Economy, Freight Air, Great Lakes, Hemisphere, Monarch, North American, Paul Mantz, Peninsular, Trans-Alaskan, Trans American, Trans National, The Unit Export Co., Western Flying Service, World Wide Airlines.

Airline Commentary

By Eric Bramley

One of the perennial hot subjects in the airline business is commission payments to travel agents on domestic tickets. In the past, efforts have been made to cut the present 5% paid on one-way and round-trip travel. They weren't successful. Now the word's around that Capital Airlines next week will propose that commissions be increased. This is in line with president "Slim" Carmichael's statement to the American Society of Travel Agents that the agents deserve a better break. Capital hasn't released its proposal, but here's what it's expected to include: 5% on one-way tickets, 10% on round-trips, and 5% on air travel plan sales (there's no ATP commission now). This should result in considerable debate at this week's meeting of Air Traffic Conference's agency committee. There are some who don't share Capital's views.

* * *

Interesting approach to improved passenger service is being taken by Pan American World Airways, which is in the process of dressing up its first-class "President" Stratocruiser flight on the Atlantic route. A fourth cabin attendant is being added, training of cabin personnel will include instruction at Maxim's, in Paris, and course-by-course dinner service is being started. But beyond this, PAA says, "we will add the one thing that is now lacking on many of our flights—the one thing that can only come with maturity—with 'coming of age'—and that is dignity. . . . Right now we can all begin the transition from the wise-cracking 'pal' approach of the bistro to the dignified, solicitous, true host relationship of a 'Claridge's' ". A worthwhile project for any carrier.

* * *

Washington National Airport, which has long had one of the most inadequate baggage rooms in the U.S., has come up with an A-1 improvement. An additional room—it's a self-claim deal—has been opened and delivery of bags to passengerss has been speeded materially. At present there's one unguarded door; you could pick up a bag and escape into the terminal without surrendering a check. This is to be corrected shortly. Anyway, the new room's the best thing that's happened at WNA in years. Incidentally, speaking of unguarded doors, we're told there are at least two points in the U.S. where airlines aren't requiring passengers to surrender checks after picking up bags. This "honor system" is said to be working well. Could be the idea will spread.

* * *

In reporting the recent transcontinental trip via local service airlines of Trans-Texas' Jim Beck, we did Bonanza Air Lines an injustice. We said Beck rode Los Angeles-Phoenix on Southwest. It should have been Bonanza, of course, and we hereby give it back its route, with apologies.

Sales, Traffic, Promotion

Hats off to **Scandinavian Airlines System** for the cleverest and most colorful direct mail piece seen in many months. Features a drawing by "Alice, of grade 3B," who saw her daddy off to Europe on SAS. Shows him entering the cabin, and also has sketches of other planes at the field. Theme is that he "forgot to take Alice," but decided on his return that "next time we all fly on Family Plan." Drawing looks like the work of a third-grader. But SAS v.p. Warren Kraemer tells us it was done by Keith Gould, the company's artist, who he says shows exceptional "capacity for recapturing the fanciful but limited ability of a child" . . .

Avianca, Colombian National Airways, has changed its reservations procedure on New York-Jamaica-Colombia flights. Under the new setup, when space can't be confirmed immediately but there is a chance that it will become available, the traveler is informed that he's on an active wait list. If there is no chance, he's not listed. Formerly, he was listed regardless of chances. The company has determined percentagewise the turnover for each flight, and that determines the length of the wait list. Since the plan has been in operation, most of the people on the active list have been able to depart on the day they desired, Avianca says . . .

American Airlines won top honors for best newspaper ads of 1956 in a survey by *Transportation Ad-Views* . . . **United Air Lines** received National Association of Travel Organization's award of merit for its 1956 series of travel posters . . .

Los Angeles Airways now has its own reservations and information office just inside the main entrance of the TWA terminal building at Los Angeles International Airport. Previously, TWA handled the helicopter carrier's reservations under a contract agreement. LAA is now operating 92 flights daily to and from the airport, and increased traffic necessitated establishment of the new office. Last week the office was tied in on the nationwide Z-circuit . . .

Sabena Belgian World Airlines is the first foreign airline to advertise in *Life* magazine. First full-page ad in January 21 issue features service "to the heart of Paris," which starts March 1 (DC-7C New York-Brussels, Sikorsky S-58 helicopter Brussels-Paris . . . **Delta Air Lines** is carrying four-color full pages in *Time, Newsweek* and *The New Yorker* . . .

Continental Air Lines believes it has the "first drive-in airline ticket window in the nation" in Oklahoma City's Skirvin Tower Bldg. Window is cut through the back wall of the city ticket office onto the alley. CAL's claim may be disputed; we seem to recall other announcements of "firsts" for drive-ins . . .

National Airlines has completely redesigned its timetable. Four colors, featuring yellow. A vast improvement . . . Allegheny is now giving an employe 2% on the international air fare if he is primarily responsible for selling an international ticket on Allegheny stock. Company retains the other 5% commission . . .

Delta Air Lines has moved its Chicago reservations department to new and larger quarters in the Williams Bldg. and has installed completely automatic telephone equipment . . . Delta has a new DC-7 plastic model kit, available to passengers at $2 plus tax . . . Braniff's blue and white sleeper bags are now being sold to the public at $1.50 each . . .

Capital Airlines will open a ticket and reservation office at Fifth Ave. and 48th St., New York—the 12th Capital ticketing outlet in the metropolitan New York area . . .

American Airlines has adopted "Holiday on Wings" as the name to cover its vacation sales program. The name will be used wherever appropriate in AA's vacation advertising and promotional material . . . Panagra has launched the most extensive advertising and promotional campaign in its history. Low-cost group excursion fares to South America will be featured . . . Harry W. Graff Inc., New York, will handle all U.S. advertising, public relations and sales promotion for Cubana . . . **Ray-O-Vac** is spotlighting Capital Airlines in a series of TV commercials on 72 stations advertising flashlights and batteries. Tie-in is also being used in window displays, counter cards and posters . . .

Frontier Airlines has worked out a deal with leading drive-in theaters in Denver to use their highway billboards—normally empty in winter when theaters are closed—to advertise travel to Arizona. Next summer, a trailer will be run each evening at the theaters to build interest in a drawing among patrons for a package vacation to Arizona the following winter.

the bulletin board

Undisplayed Advertising: $1.50 per line, minimum charge $4.50. Cash with order. Estimate 30 capital letters and spaces per line; 40 small lower-case letters and spaces per line. Add two lines if Box Number is included in lieu of advertiser's name and address.

Displayed Advertising: $18.00 per column inch. Space units up to full pages accepted in this section for classified-type advertising.

Forms close three weeks preceding date of issue. Address all correspondence to Classified Advertising Department, American Aviation Publications, 1001 Vermont Ave., N. W., Washington 5, D. C.

Help Wanted

AIRLINE MECHANICS

In March we open our new hangar in Los Angeles where all phases of airline maintenance will be performed on DC7-B, Viscount, and Boeing Jet. We will have positions for licensed and non-licensed men with experience. To apply write:

CONTINENTAL AIR LINES
Stapleton Field Denver, Colorado

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Contracts

New Air Force contract awards:

Curtiss-Wright Corp., Wood-Ridge, N.J., $4,052,250, repair, modification, test and packaging of electric propeller assemblies; $1,910,000, improvement of J65 engine.

The Martin Co., Baltimore, $3,340,480, parts and tooling for modification of aircraft.

Lockheed Aircraft Service Inc., Ontario, Calif., $4,822,061, IRAN and modification of RB F-94 aircraft.

Firestone Tire & Rubber Co., Los Angeles, $1,756,846, design and manufacture of a stowage and launching system for guided missile.

Oakland Aircraft Engine Service, Oakland, Calif., $1,216,416, overhaul of R-2800 engines.

Spartan Aircraft Co., Tulsa, Okla., $1,036,190, maintenance and overhaul of R-2000 engines.

Bendix Products Div., Bendix Aviation Corp., South Bend, Ind., $3,370,054, wheel and brake assemblies for B-52D aircraft.

Continental Electrolog Corp., Brooklyn, N.Y., $2,225,000, planner and computer.

Bell Aircraft Corp., Ft. Worth, Tex., $1,996,918, HTL-7 helicopters.

RCA Service Co., Camden, N.J., $1,031,949, field engineering services for aircraft and electronic equipment.

The Commerce Dept. announced the following contracts, which are with USAF unless otherwise indicated:

Collins Radio Co., $1,245,940, radio transceivers.

Stromberg-Carlson Co., $1,745,433, radio beacons.

Sperry Gyroscope Co., $1,740,257, radio beacons, and $1,251,365, flight controllers.

Allison Div., General Motors Corp., $1,427,520, modification and conversion of J33 engines.

Radio Corp. of America, $1,101,110, radio receiving sets.

Facilities

Douglas Aircraft Co. will spend $3 million of its own money, on top of the $1,305,500 contract awarded by USAF, for construction of a guided missile facility in the Sacramento area in 1957. The 1,700-acre site adjoins Aerojet-General's rocket engine test grounds. Facility will be used first for development work on USAF's Thor intermediate range ballistic missile.

Ramo-Wooldridge Corp. has completed the first building of a nine-unit research and development center on a 41-acre tract south of Los Angeles International Airport.

Radio Corp. of America has established a special systems and development department devoted to planning and development of broad electronic systems for future military needs. Dr. C. B. Jolliffe, v.p. and technical director of RCA, will manage the new department.

Keuffel & Esser Co., Hoboken, N.J., will open a new plant at Cranford, N.J., next month to expand its production of precision equipment for optical tooling.

Misco Precision Casting Co., producer of investment castings, has opened new facilities in Muskegon, Mich. Company's principal production is in support of the aircraft engine industry.

Norden-Ketay Corp. will lease a new plant being built in Commack, Long Island, N. Y., for its precision components division.

Vertol Aircraft Corp. has leased a third hangar at Philadelphia International Airport, increasing by 50% its facilities for flight testing and line maintenance.

Goodyear Aircraft Corp. plans to construct at Akron a 20,000-sq. ft. addition to rocket component production and development facilities.

Servomechanisms Inc. will construct a new 55,000 sq. ft. million-dollar plant in eastern Nassau County, N. Y., to house engineering and production operations of its airsystems group. Another plant for this group, located in Westbury, Long Island, will remain in operation after the new plant opens late this year.

Fluid Regulators Corp., manufacturer of aircraft hydraulic and fuel valves, has moved into a new, larger plant at 313 Gillette St., Painesville, O. Company was formerly located at 250 E. Main St., Painesville.

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Congo Customs: Some Strange, Some Shocking

When I started out on the Belgian Congo safari last June it was my full and honorable intention to investigate and report to you dear readers all about the strange rites of female circumcision.

I fell flat on my face. Literally—almost. Not for lack of source material, but simply because my stomach couldn't take it. Female circumcision is still practiced by two tribes in the Congo but is much more common throughout French Equatorial Africa, Uganda and such places.

This is the first cultural defeat I've experienced in trying to tell you the off-beat facts about the globe. But I had to back out of learning more about these rites else I'd have passed out in a dead faint. I can take a lot of things, but not this. So if you want to know what it's all about, dig up your own sources or read Bob Ruark's book on Africa. I've lost all interest and damn near lost my lunch too.

Male circumcision is almost universal in native Africa. All but one tribe in the Congo have elaborate secret rites and it isn't often that Europeans are permitted to be observers. The rites are held in the forest and the youth must remain in the forest until healed.

Cannibalism Still Exists

It wasn't many years ago that cannibalism was commonly practiced in the Congo. Even now there is evidence that it still exists in remote areas.

Black magic survives in many forms. So do the jungle drums, which still comprise a major communications system.

There are both patriarchal and matriarchal family systems in the Congo, although the latter is dying out. Polygamy is tolerated but is gradually disappearing, possibly due to the high cost of wives, but also because the Belgians frown on the practice of multiple wives.

You may have read that the natives purchase wives, but this is a little misleading. A man pays a dowry for his bride and the price has been going up quite a bit lately—up to $100 in the cities.

But it isn't a straight purchase. It is compensation to the woman's family for the loss of one of its members. A woman is a workhorse, a valuable worker, and the bearer of more workers. So naturally a father wants to be paid when he loses a healthy daughter.

The man who pays gets a guarantee. If the bride doesn't bear children, she can be returned with money back. If she runs away, the husband gets his money returned except for a deduction for the amount of time the woman lived with him. Divorce is permitted for sterility, moral turpitude, serious injury, slander and the like.

All these marriage matters, runaways, payments, etc., are handled by native tribunals, or courts. Our press group stopped and watched one of these local tribunals in a small village. A young bride had run away and the father was trying to avoid making full restitution of the purchase price because the girl had served as a wife for a period of time. All the participants were on the front bench facing the native judge. It was a hot session, a lot of talking and waving of hands, with an interested audience in the background. We didn't wait for the verdict because the case may have gone on for days. Runaway wives make important court proceedings.

In the lower Congo matriarchy still survives in some tribes. Here the family ties are founded on the descent from a common mother, instead of the father. The children belong to their mother's family. They live on land owned by the maternal clan. The closest male relative is not the father, but the maternal uncle. The family head is the maternal uncle or granduncle who has himself descended from their common ancestor through the female line.

Complete nudity in the Congo is now rare, although in the vast back country a large portion of the population still wears just the minimum. But in cities and towns the natives are pretty well covered up and go in for loud colors for their garments.

Pygmies have no tattooing or similar ornamentation, but the millions of Negroid natives go in for a weird assortment of things. Many have a fondness for complicated and odd coiffeurs. Mutilation of the skin is common. They make a simple incision leaving only linear scars usually in some sort of design. Wounds are made to fester. Many file their teeth and pierce their ears, lips and noses, inserting movable trinkets. There is even quite a bit of body painting.

Insertion of rings in lips is dying out, although there are still to be found some old women with discs as much as four inches in diameter in their lips.

Heads Deformed

Deformation of the head, sugarloaf style, is still very much in fashion in the north. We saw many examples. While the bones of infants are still soft, their heads are tightly bound and made to grow in elongated form.

The natives like firewater and learned to distil hard liquor long ago. Banana beer seems to be the most popular—and potent. But they also make beer from corn or sorghum or other grains. They also make palm wine. Getting drunk is quite a common diversion.

The common language over most of the Congo is Kishwahili, derived from the language of the Arab slave traders in the east who used to plunder the area for slaves. But there are three other languages in the Congo and many dialects.

The one word I learned was Yumbo. It means "hello." Works too. Whenever I passed natives I said "Yumbo" and back would come a big smile and a "Yumbo" in return. So Yumbo to you, too.

This scene at a native market proved to be very popular with the photographers in our group. Snapshot was taken just after one of the men in the party had given some coins to the gal with arms outstretched. She couldn't understand why she had been given money for doing nothing and her perplexity is clearly evidenced in her expression. If her talents weren't exactly hidden, they were at least unrecognized by the owner in this faraway African spot.

HOW FAR IS

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1959

Boeing 707 jet, 575-m.p.h. luxury airliner, will be put in service by Continental in August, 1959. Plane will have all latest comfort and safety features.

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